

TECHNICAL STORAGE
The Only Weekly Mining Paper in the Union and Rhodesia.

3
v. 26
pt. 1
no. 1318
Physical & Applied Sci. Serials
Engineering
THE
South African

MINING JOURNAL

WITH WHICH IS INCORPORATED

The South African Mines, Commerce & Industries

ESTABLISHED 1891

PUBLISHED EVERY SATURDAY

VOL. XXVI., PART I, No. 1318.] THE SOUTH AFRICAN MINING JOURNAL. DEC. 30, 1916. [WEEKLY, PRICE 6s

W. L. SAUNDERS, Chairman of Board.

W. R. GRACE, V.P. and Treas.

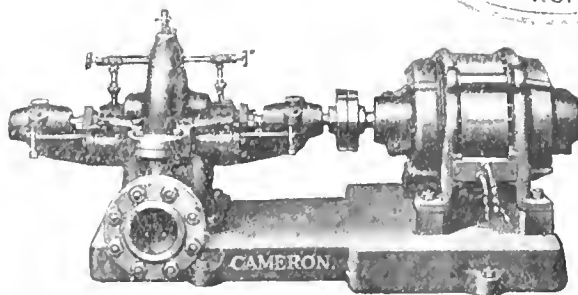
F. A. BRAINERD, Secy.

GEORGE DOUBLEDAY, President.

J. H. JOWETT, Genl. Sales Mngr.

Physical &
Applied Sci.
Serials

Cameron Centrifugal Pumps.



All Parts Accessible without Disconnecting Piping.
Reliability---due to Simplicity of Design.
Efficiency---due to Careful Design and Workmanship.
Built in all Sizes and Capacities.

INGERSOLL-RAND CO.

Exploration Buildings.

Johannesburg.

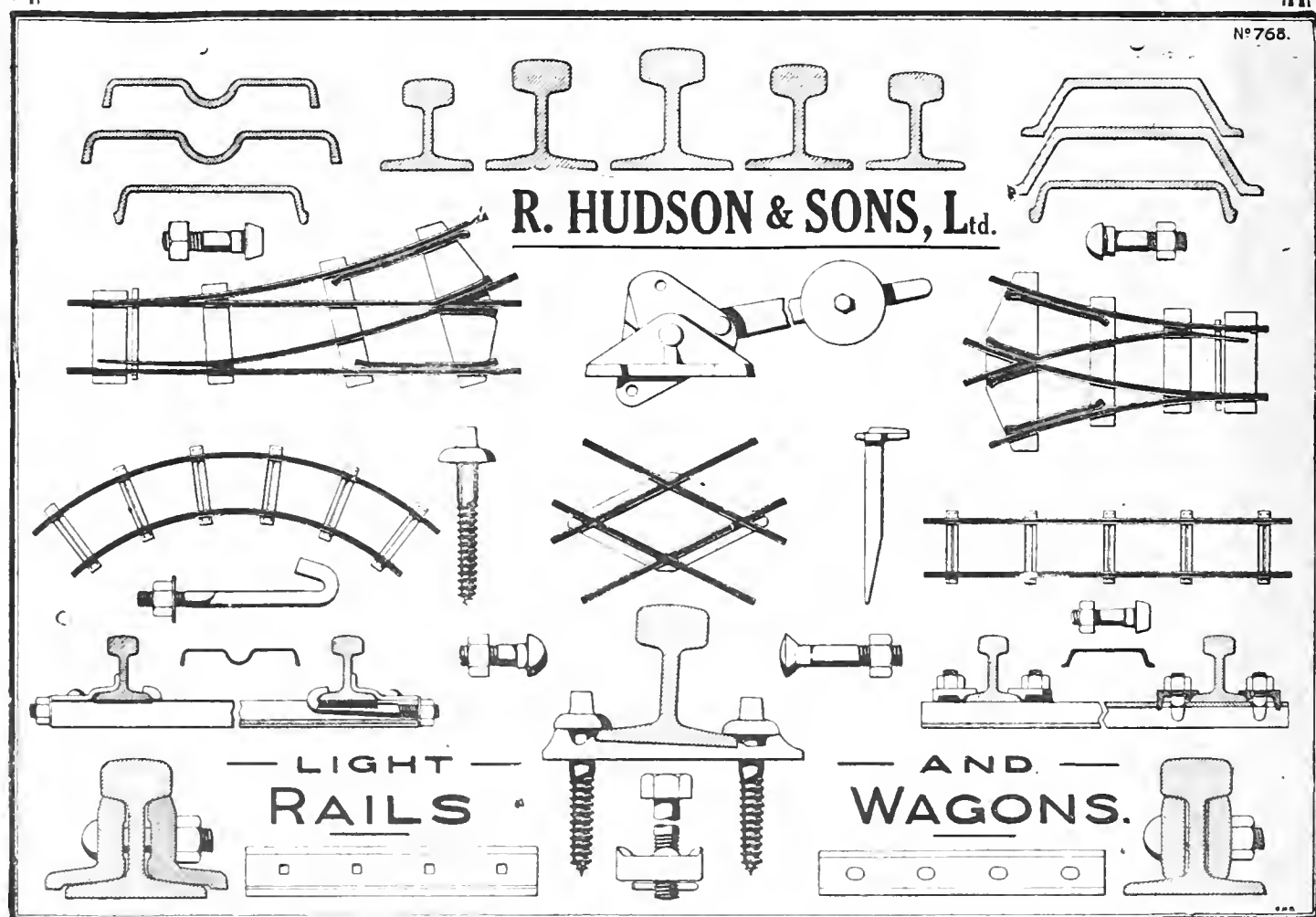
ROBERT HUDSON & SONS, LIMITED.

WORKS:—GILDERSOME FOUNDRY, Near LEEDS.

Phone 1731. Box 5744. JOHANNESBURG.

Tel. Add.:
"RALETRUX."

MANUFACTURERS OF
Tramway Material for Mines, Plantations, etc.



LIGHT LOCOMOTIVES.

STEEL WAGONS FOR GOLD AND DIAMOND MINES.
HOPPER WAGONS FROM ONE TO FORTY TONS CAPACITY.

Steel Colliery Tubs.—Self-Oiling Wheels and Axles.—Bearings.

Wagons for Sugar Cane Plantations.

STEEL RAILS—ACCESSORIES—STEEL SLEEPERS

PRICES AND SPECIFICATIONS ON APPLICATION.

Large Stocks held at DURBAN, DELAGOA BAY, BEIRA, JOHANNESBURG, SALISBURY, etc.

Rhodesian Agents: P. PEECH & CO., Salisbury, Rhodesia.

HEAD OFFICE: 82, 83, 84, Cullinan Building, Johannesburg.

"INDUSTRY AS USUAL."

LIST OF

Manufacturers & Agents belonging to the British Empire, her Allies & Friends.

HERBERT AINSWORTH,

Engineer and Merchant, 304-307, The Corner House, Johannesburg, South African Agent for Green's Patent Fuel Economisers, Kennicott Water Softeners, Wood's Colliery Plants and Winches, Hart's Lambeth Cotton Ropes, Canadian Carbide, "S" Brand.

EDGAR ALLEN & CO., LIMITED,

5, New Club Buildings, Loveday Street, Johannesburg. Miner's Drill Steel, High Speed Steel, Engineer's and Smith's Tool Steel, Tappet Key and Gib Steel, Manganese and Hard Steel Grizzly Bars, Tube Mill Liner Bars, Skip Wheels, Truck Wheels and Axles, Twist Drills, Shovels, Hammers, Shoes and Dies, Buffers, Railway and Tramway Points and Crossings, Ore Crushers, Tube Mills, Cement Kilns, etc.

BARTLE & CO., LTD.,

Loveday House, Johannesburg. 'Phones 3553-4. Sale Agents for Sanderson Bros. & Newbould, Ltd., Sheffield; F. Reddaway & Co., Ltd., Manchester; Henry Pooley & Son, Ltd., Birmingham; John Shaw, Ltd., Sheffield; J. W. Roberts, Ltd., Leeds; Gimson & Co., Ltd., Leicester; T. Lister & Co., Ltd., Brighouse; John Davis & Son, Ltd., Derby; Unity Safety Fuse Co., Scorrier; F. Bartle & Sons, Carn Brea; and many other well-known British Manufacturers.

BATES, MASON & CO., LTD.,

Machinery Merchants, Box 1895. 'Phone 2807, Government Square, Johannesburg, have large stocks of mining machinery, agricultural and building material, etc., new and second-hand, for sale cheap. Buyers of all classes of machinery and buildings for cash.

BRITISH GENERAL ELECTRIC CO., LTD.,

Corner Loveday and Anderson Streets, Johannesburg. Electrical Plant and Supplies of all descriptions. 'Phones 4242-4243; Telegrams, "Current"; Box 2406. Branches at Capetown, Durban, Bulawayo, etc.

HUBERT DAVIES & CO.,

Electrical and Mechanical Engineers, for all kinds of Electrical Machinery and Supplies. Johannesburg, Durban, Capetown and Salisbury (Rhodesia).

The Denver Rock Drill & Machinery Co., Ltd.

'Phone 1426. Box No. 2367. 1-5, Royal Chambers, Johannesburg. "WAUGH" Air Feed Hammer Drills, for all classes of mining; DENVER Brand of Rubber Conveyor Belting; Rock Drill and Water Hoses, Red Sheet Packing, Grey Insertion; "DUXBAK" Waterproof Leather Belting and Waterproof Cement; "CLARK" Air Meters. Large Stocks always on hand.

FRASER & CHALMERS, LTD.,

Corner House, Johannesburg; also representing Holman Bros., T. and W. Smith, Ltd.; Tanyes, Ltd.; G. and J. Weir, Ltd.; and many other British agencies.

HADFIELD'S LTD.

(Incorporated in England.)

46 47, Cullinan Buildings. 'Phone 5900, Johannesburg. Cast Steel Gyating and Jaw Crushers and Crusher Spares, Wheels and Axles, Pedestals, Rollers, Pulleys and General Steel Castings.

HARVEY & RUSSELL, LTD.,

96, Frederick Street, Box 2043, Telephone 4004, Johannesburg; Power Transmission Machinery, Dewrance's Steam Fittings and White Metals, Machine Tools, "Rigby" Steam Hammers, Steel Construction Work, "Vislok" Patent Lock Nuts.

HOSKEN & CO., WM.,

Mining Material Merchants, Hosken's Buildings. P.O. Box 667, 'Phones 4113-9. Telegrams: "Hosken," Johannesburg. Agents for "Hydromax" New Water Hammer Drills. The fastest rock drill in the world.

ROBERT HUDSON & SONS, LIMITED,

Works: Gilderscme Foundry, near Leeds. 83-4, Cullinan Buildings, 'Phone No. 1731. Telegraphic Address: "Raletrux." Manufacturers of all classes of Light Railway Material for Mining and Contractor use. Rails in all weights per yard. Switches and Crossings, Standard Trucks of various capacities kept in stock.

INGERSOLL-RAND CO.,

Exploration Building, Johannesburg. Air Compressors, Rock Drills, Hose, Steel, Pneumatic Tools, Cameron Pumps, Leyner Drill Sharpeners, Davis Calyx Coil Drills.

PHOENIX FOUNDRY,

Iron and Brass Founders, General Engineers and Blacksmiths. Office and Works: Hay Street, Ophirton. P.O. Box 3031, Johannesburg. 'Phone 1641. Sole Agents for Carntyne Steel Castings Co., Glasgow. Stocks of Tappets, Skip Wheels, Heads, etc. Casting Specialities: Pipe Fittings, White Iron Pump Spares and Tube Mill Liners.

REUNERT & LENZ, LTD.,

Consolidated Building (3rd Floor), Johannesburg; P.O. Box 92; Telephone No. 3061. Sole Agents for North British Locomotive Co., Ltd.; Leeds Forge Co., Ltd.; Babcock and Wilcox, Ltd.; Belliss and Morcom, Ltd.; Davidson and Co., Ltd.; Frank Pearn and Co., Ltd.; "Atlas Rock Drills," John Stephens and Son, Ltd.; E. and W. Lucas, Ltd.; Sir Joseph Jonas, Colver and Co., Ltd.; John Spencer and Sons, Ltd.; and many other high-class British Manufacturers.

SANDYCROFT, LIMITED,

Works: Chester, England. Offices, 63-64, Standard Bank Chambers, Telephone No. 360, P.O. Box No. 1976, Johannesburg. Suppliers of Stamp Battery Requisites of all descriptions, Belting, Winches, Ropes, etc.

FATTI'S S.A. MACARONI FACTORY,

Suppliers of Soup Macaroni to the Mines, etc. (for the Natives). This pleasing, nourishing and economical new food is much appreciated by Mine and Compound Managers, as they find in it an opportune change of the somewhat monotonous diet of the Mine Boys. Box 1139. 30 32, Jeppe Street, Johannesburg. 'Phone 962. (L. FATTI and Co., Ltd.)

S. SYKES & CO., LTD.

Southern Life Buildings, Johannesburg. Telephone No. 2190. P.O. Box 2303. Telegrams: "Psyche." Sole Agents for Robey & Co., Ltd., Crossley Bros., Ltd., E. R. & F. Turner, Ltd., Worthington Pump Co., Ltd., C. A. Parsons & Co., Ltd., Crompton & Co., Ltd., and Reyrolle & Co., Ltd.

E. W. TARRY & Co., Ltd., Austral Iron Works,

Corner of Anderson and End Streets, Box 1098. 'Phones 149 and 626, Johannesburg. Iron and Brass Founders and General Engineers. Machine Cut Gears in Raw Hide and any Metal a speciality, and in Cast Iron up to 18 feet diameter. Sole Manufacturers and Agents for Tregaskis Patent Drill Heating Furnace.

WADE & DORMAN, LTD.,

Box 2297; Telephone 1460, Johannesburg. Structural Steel Work of all kinds. Large Stocks of Joists, Channels, Angles, Tees, Plates, Chequered Plates, etc. Agents for British Steel Piling Co. Stockyard and Works: 217, Main Street.

C. F. WIENAND,

Commercial Exchange Buildings, Johannesburg; 'Phone 3. Sole Agent for Toledo Steels of all classes, Butterery Iron, Barwell's Bolts, Scott's Ropes, Mine Lubricants, Ltd., Stelastic Tyres. All highest quality.

PROFESSIONAL DIRECTORY.

LITTLEJOHN & WHITBY,

ASSAYERS TO THE
AFRICAN BANKING CORPORATION,
NATIONAL AND NATAL BANKS.

CONSULTING ANALYTICAL
CHEMISTS AND METALLURGISTS,

P.O. Box 849. 'Phone 1633.

Office and Laboratories:

IMMONDS STREET, JOHANNESBURG.

Assays and analyses of all Minerals, Drugs, Foods, Water,
Milk, Oils, etc., undertaken.

Experiments conducted. Reports made as to the treatment
of any class of Ore.

J. GOULDIE, C. & M.E., M.I.M.E., CONSULTING ENGINEER.

*Late Manager to the De Beers and other Diamond Mines.
30 years practical experience in Diamond, Gold, Coal, and
Metalliferous Mining in South Africa, and holder of Mine
Manager's Certificate (First Class).*

Mines and Mineral Propositions Inspected and
Reported Upon.

Office: 62, Standard Bank Chambers, Commissioner St.,
JOHANNESBURG.

Phone 2225. Telegraphic Address: "Edloug, Johannesburg."

Code: Imperial Combination and A.B.C. (5th edition).

Reference: The National Bank of South Africa, Limited, here
and in London.

PATENTS AND TRADE MARKS.

D. M. KISCH & CO., (C. H. M. KISCH—A. L. SPOOR).

ESTABLISHED 1874.

Members Chartered Inst. of Patent Agents, London.

COLONIAL AND FOREIGN PATENT AGENTS.

*The Firm undertake the Patenting of Inventions, and the
Registration of Trade Marks throughout the world; the
Preparation, Revision or Amendment of Specifications
and Drawings; reporting on Validity and Infringements;
obtaining copies of Specifications and Drawings of
Patents granted; Searches through the Patent Office
Records; the conduct of Oppositions, and all other
matters relating to Patents and Trade Marks.*

No. 16 to 19a, NATIONAL MUTUAL BUILDING,
Corner of Rissik and Market Streets.

P.O. Box 668.

Telephone No. 774.

J. E. MILLS DAVIES,

CONSULTING MINING ENGINEER,

180, Stock Exchange Buildings, Johannesburg.

P.O. BOX 418. TEL. ADD.: "MINING JOURNAL." TELEPHONE 913

W. HOLMAN JAMES, M.I.E. (S.A.) M.(S.A.) I.E.E.

CONSULTING ELECTRICAL & ELECTRO-CHEMICAL ENGINEER,

17, 18 & 27, National Bank Buildings,

P.O. Box 5685.

JOHANNESBURG.

Telephone 5876.

G. A. WATSON, EXPERT COMMERCIAL PHOTOGRAPHER,

17, Hosken's Buildings, Cor. Rissik & Fox Streets,
Box 667, JOHANNESBURG.

Photographs of all the Leading Mines on the
Rand. Enlargements a Speciality.

Our Framing Department has all the latest
Mouldings. Machinery a Speciality.

Printing, Bookbinding, Account Books, Tracing Cloth, Transfer Paper,
Drawing Paper, Ferro Prussiate, Ferro Gallic, Indian Inks, Rubber Stamps,
Stationery of all descriptions, Draughtsman's and Surveyor's Requisites.

C. E. FOLKEY, Stationer & Printer.

Ask for a Quotation for Stationery or Printing.

7, MARSHALL SQUARE BLDGS., opposite main entrance Stock Exchange

TELEPHONE 2095.

NOTICE: To Mine Managers & Others

M. CHADWICK & CO., Scrap Metal and Rubber Buyers, are pre-
pared to pay highest prices for Copper, Brass, Lead, Zinc, Cast
Iron, or metal of any description. Lead, Zinc, White Metal in In-
gots always on hand for sale at lowest prices. Write, send, or
Telephone 5072, Box 2700, 55, Sauer Street. Prompt attention
guaranteed. Distance no object.

PILLATT & CO., Ltd., Stapleford, Nottingham, ENGLAND.

Agents: Bellamy & Lambie, 621 3, Consolidated Buildings,
Johannesburg, Box 453, Phone 1514. "Perfect Combustion"
Furnaces, special type, for all types Steam Boilers. Roasting
Furnaces and all kinds Apparatus burning solid fuel. Waste
and cheap fuels a special feature.

Cable:
"McKECHNIE,
WIDNES."

McKECHNIE BROTHERS, LIMITED.

SMELTING WORKS: WIDNES, ENGLAND.

LONDON OFFICE: 11, LOMBARD STREET, S.E.

BIRMINGHAM, NEWCASTLE, MANCHESTER, LEEDS AND BRISTOL.

BUYERS OF

COMPLEX ORES

Which contain COPPER.

COPPER-TIN ORES.

COPPER-LEAD ORES.

COPPER-ZINC ORES

Residues, Mattes, Concentrates, Precipitates.

Engineering Works and Foundries.

ESTABLISHED 1888.

Wright, Boag & Co.

**ENGINEERS
AND
FOUNDERS.**

Offices: Frederick Street.

Works: Marshall's & City and Suburban Townships.

Telephones:
1056 and 1057.

P.O. Box
545.

Tel. Add.:
"SWIVEL."

JOHANNESBURG.

P.O. Box 3960.

Telephone No. 877

W. H. BATTEN
(Late BATTEN & EDGAR)

**The RAND BOILER, TANK,
:: and IRON WORKS. ::**

Trucks, Steel Cyanide Tanks, Chimneys, Cones, Skips, and all Mining Plate Work a speciality.

Office and Works: Albert, Gold, Durban and
Nugget Streets, City and Suburban.

New Industries in South Africa.

THE VERDITE MINES yield Gold, Nickel, Greenstone, French Chalk, Talc and Soapstone, from which are produced:—

Talcum Powders, Boilermakers' and Engineers' Pencils (for marking iron and steel), Crayons, the beautiful "Verdite" Greenstone for Building Decoration, Ornamental Work and Jewellery.

The Greenstone is unique, is found in no other part of the world, and there is no other Gold Mine in existence which produces so many useful by-products.

From a small beginning and accidental discovery this is rapidly growing to be one of the leading industries of South Africa.

**Austral
Iron
Works.**

**ENGINEERS
AND
FOUNDERS.**

Special Metal for
wearing plates for
Tube Mills and
Centrifugal Pumps.

Machine Cut Gears in Raw Hide or any Metal a
Speciality.

And in Cast Iron up to 18 feet diameter.

Sole Agents and Manufacturers of Tregaskis'
Drill Heating Furnace.

E. W. TARRY & Co., LTD.

Anderson and End Streets,
JOHANNESBURG.

'Phone 149.

Box 1098.

Tel. Add.: Austral."

The Metropolitan Engineering Works.

A. E. COWLEY & SON, Sole Proprietors.

269, MARSHALL ST., JOHANNESBURG.

ESTABLISHED 1883.

Manufacturers of every description Cast-Iron Castings, Gun Metal, Bronzes, Heavy Stamper Boxes, & complete Sand Pumps, Spares, Tube Mill Liners, etc.

Machine Shop with Newest and Most Up-to-Date Machinery.

Capable of turning out the Largest Work.

ALL WORK GUARANTEED.

QUICK DESPATCH

Tel. Add. "Metrop." Phone 1824. Night Phone 103.

JOHANNESBURG.

JAMES SMITH,

Surface and
Underground.

Diamond Drilling
Contractor.

P.O. Box 3180, JOHANNESBURG.

The best "Reef Traveller" is the *South African Mining Journal*.

P.O. BOX 1553.

Telegraphic Address: "AINSCO."

TELEPHONE 356.

HERBERT AINSWORTH,

304-307, THE CORNER HOUSE (THIRD FLOOR), JOHANNESBURG.

CRANE

FOR PRESSURES UP TO
175 LBS.
CAN BE PACKED WHEN
OPEN.
CAN BE REGROUND
WITHOUT DETACHING.

NAVY

UNION BONNET

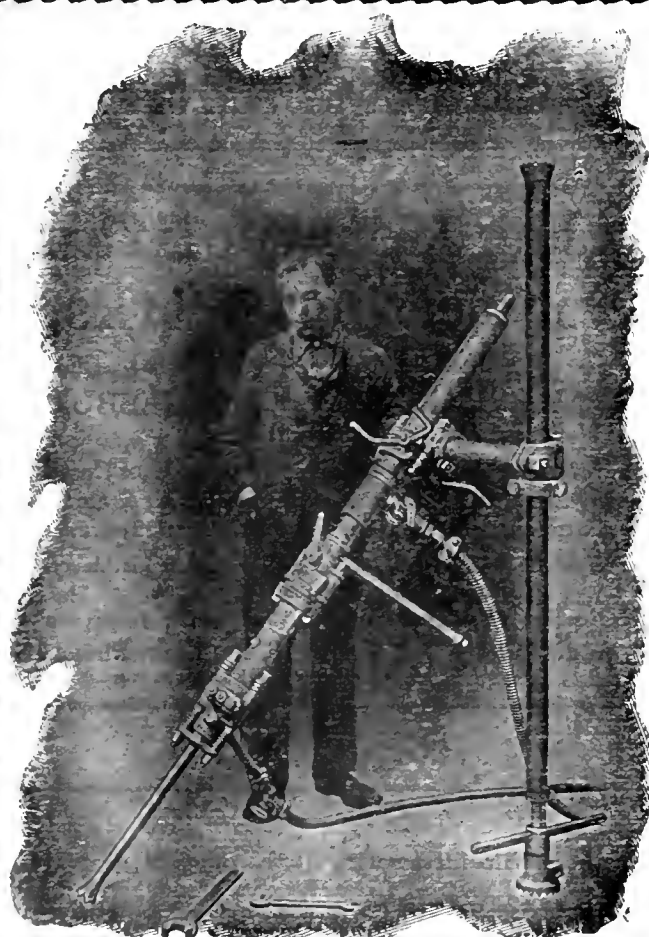
REGRINDING

TESTED TO 250 LBS.

VALVES

MADE IN

GLOBE, ANGLE & CHECK PATTERNS.



"HYDROMAX"

New Water Hammer Drills to
supersede Reciprocating Drills.

The "Hydromax" weighs 80lbs.
Suitable for Stopping, Raising and Driving.
It Drills 30% faster than any other drilling machine.
Low Air Consumption.
No Mine Manager can afford to neglect the economic
merits of the

"HYDROMAX"

THE FASTEST ROCK DRILL IN THE WORLD.

We have exclusively manufactured drills for thirty-seven years
and the "Hydromax" is our crowning effort.

THE CLIMAX ROCK DRILL & ENGINEERING WORKS, LTD.,
CARN BREA, CORNWALL.

WM. C. STEPHENS, Managing Director.

Agents—

WM. HOSKEN & CO.,

BOX 667, JOHANNESBURG.

Phones 4113,9.

Telegrams: "HOSKEN," Johannesburg.

THE SOUTH AFRICAN
Mining Journal,

WITH WHICH IS INCORPORATED

South African Mines, Commerce and Industries.

ESTABLISHED 1891.

VOL. XXVI., PART I.] DECEMBER 30, 1916. [No. 1318.

HEAD OFFICE: 176-180, Stock Exchange Buildings, Fox Street (2nd Floor), Johannesburg, Union of South Africa.

Telephone **913**. P.O. Boxes **963** and **418**.

Cable and Telegraphic Address: "**MINING JOURNAL**."

AGENTS FOR GREAT BRITAIN: Argus South African Newspapers, Ltd., Byron House, 82-85, Fleet Street, London, E.C.

AMERICA: Gotham Advertising Co., 95, Liberty Street, New York.

ANNUAL SUBSCRIPTION RATES: Oversea, £2; Union of South Africa and Rhodesia, £1 10s.; Local Delivery (Town only), £1 6s.

Copies of this journal are obtainable at all Branches and Agencies of the Central News Agency, Ltd., at all News Agents and Railway Bookstalls throughout South Africa, and at the London Agency as above.

NOTICE.—The postage of this issue of the *S.A. Mining Journal* is: South Africa, 1d. All other parts, 1½d.

CONTENTS.

PAGE

Notes and News	411
Topics of the Week:	
The Goldfields Year	413
Mine Signboards	414
Progress of the "Safety First" Movement	415
The Year with the Luipaardsvlei Estate	416
The Year with the Consolidated Gold Fields	418
The Year's Transvaal Gold Mine Dividends	419
Ore Treatment at the Falcon Mine, Rhodesia	421
The Week in the Sharemarket	423
The Week in the Mining Material and Engineering Trades	425
Engineering Notes and News: Electrical System of the Rand Power Companies, with Special Reference to Methods of Operation and Experience—V.	427
Company Meetings: South African Diamond Corporation; New Thor Diamonds; Blaauwbosch Diamonds; Pniels; Consolidated Gold Fields; Fraser and Chalmers	429

Notes and News

The control and management of the Randfontein Estates G.M. Co., Witwatersrand, Ltd., the Randfontein Central G.M. Co., Ltd., and the Langlaagte Estate and G.M. Co., Ltd., having changed hands, the Board of Directors of the Randfontein Estates and Randfontein Central Companies informs shareholders that both these companies are in a position to pay a dividend at the end of this current year. It has, however, been decided, in view of the change in the control of the companies, that it would be in the interests of shareholders to defer the declaration of dividends for the present year, pending the settlement of questions relating to the future development and working of the Randfontein properties. As regards Langlaagte Estate, the Board decided some three months ago that, with a view to reducing the working costs of the company and improving its position, it was advisable to alter the present system of hauling from the deeper levels of the mine. The scheme is essentially one of shaft concentration, involving the purchase and installation of electric hoists. In carrying out the work, one shaft instead of two will become the main outlet from the mine, thereby greatly reducing working costs per ton. The expenditure involved in carrying out the above work will defer the payment of a further dividend for the present year.

* * * *

The existence of asbestos in the Swaziland system north of the Witwatersrand has been known within a limited circle for a considerable time past, and a fairly large amount of work has been done on a property north of Krugersdorp at one time or another. The last operations in that neighbourhood are said to have been carried out by some Germans, whose activities were terminated at the commencement of the war. We are unable to say much about the nature of the deposit in question, but are informed that the material taken therefrom has been found quite suitable for such purposes as the covering of steam pipes. In other directions, also, the rocks of the Swaziland system in this part of the country have apparently some economic value, which is, however, a little indefinite at the moment. For example, talc in promising quantities is said to have been discovered in several places, and there is usually a good market for this product if the output can be depended upon.

* * * *

During the month of November, according to the report of the Mines Department, there were 9,904 rock drill machines in commission on the gold mines of the Witwatersrand, but only 6,395 were, on the average, actually in use. During the same period, on producing gold mines, there were employed 211,832 coloured labourers. The quantity of rock hoisted from these mines amounted to 2,769,469 tons, and the total development was 42,864 feet in main drives and crosscuts, 1,743 feet in main shaft sinking, and 24,842 feet in winzes and other development. If we take the figures for the month of July, when the Rand coloured labour force, at 205,014, was at its lowest level for the year ended November, we find that on producing mines there were in use 6,020 rock drills, and that 2,624,333 tons of rock were hoisted; the development being 48,129 feet in drives and crosscuts, 1,988 feet in shafts, and 27,438 feet in other work. The evidence shows, therefore, that with an appreciably augmented labour force and drill capacity the development was considerably less, and the tonnage of rock only a very little more in November than it was in the earlier month. The obvious conclusion is that working efficiency, from whatever cause, has distinctly depreciated during the period referred to.

A quiet and dull tone, with a sagging tendency in prices, characterised the Stock Exchange during the month ended the 20th ult., which is covered by the usual monthly comparison of values furnished by the *Bankers' Magazine*. The list of 387 representative stocks shows a net depreciation of £33,300,000, or 1·2 per cent. Mining shares have improved, but Foreign Railway stocks have fallen £2,499,000, or 5·5 per cent.; gas stocks £1,250,000, or 5·3 per cent.; electric lighting, etc., £126,000, or 4 per cent.; and railways in British Possessions £2,579,000, or 3·5 per cent. Bank shares have been dull all round and insurance shares have weakened a little.

* * * *

The Messina report for the year to June 30 states that the production was 12,794 tons assaying 44·8 per cent., and containing 5,732 tons of copper. The ore reserves estimate at June 30, practically proved ore, 151,409 long tons of 5·2 per cent. copper and possible ore (in the developed area), 56,652 tons of 3·4 per cent. copper. The consignments were sold on the basis of an average price of £111 17s. 6d. for best selected per long ton of copper. The new South African Railway line from Zoeknakaar to Tzaneen was put into operation on August 4, 1915, and at that date the guarantee to the South African Railways became effective. The company's guarantee agreed to make up any losses in operation, such losses not to exceed £35,640 per year. The amount under this guarantee for which the company is responsible up to June 30, 1916, is £30,646. The action in connection with testing the validity of the Canadian Agency, Ltd., debentures was settled by the payment to this company of £32,500. Of this, £10,843 has been utilised in writing down the value of the above securities, and £21,657 has been placed to credit of profit and loss. After making proper allowance for depreciation, the gross profit for year is £270,433. Of this, debenture interest takes £15,000; dividend No. 1 of 1s. per share £36,358; income tax and profit tax in South Africa £42,600; and directors' additional remuneration £2,980. Of the balance £140,000 is placed to reserve, pending determination of liability for excess profits duty, leaving £33,495, which, with £9,517 brought in, makes £43,012. The directors recommend a final dividend of 1s. per share, less tax payable December 1; carrying forward £6,655.

* * * *

There were 902,072 tons of coal sold by the collieries within the Union in November, representing in value £246,067, an increase of 12,492 tons and in value £2,196, as compared with October. The November returns constitute a record. The Transvaal produced 562,573 tons, an increase of 20,075 tons; the Cape Province 3,075 tons, a decrease of 342 tons; the Free State 71,548 tons, a decrease of 2,757 tons; and Natal 264,876 tons, a decrease as compared with the previous month of 9,998 tons. The sales and shipments of copper from the Transvaal and Cape amounted to 846 tons, of the value of £50,267, and the Transvaal shipped 193 tons of tin, valued at £21,188. The Cape Province returned 666 tons of asbestos, of the value of £14,668, which, with 32 tons produced in the Transvaal and five tons in Natal, brought the total value to £15,512—another record for November, but the aggregate includes the output of certain producers in the Cape who had not hitherto forwarded monthly returns. The output of lime is steadily maintained, the total for last month being 6,335 tons, valued at £9,651. Silver in gold bullion is valued at £9,280, an increase of 756 ounces on October, and the highest figure reached since last March. The labour returns show that 30,833 whites and 285,368 coloureds were employed in mining throughout the Union. The former shows an increase of 165 and the latter of 1,760, and both are the highest figures for the year. Including the diamond output of 211,802 carats, representing in cash £626,457, the total value of the mineral production last month was £4,315,176, and for the eleven months of 1916, £46,900,641.

In reply to the board's inquiry as to the present position, the following information, dated November 23, has been received from Mr. Piper, consulting engineer of the Shamva Mines, Ltd.: "Since Dr. Corstorphine's geological report it has been impossible to carry out any of his recommendations, so far, owing to shortage of labour, which still prevails; a programme has been laid out covering expenditure of about £6,000, which will commence as soon as possible. His geological theory that formation is igneous, and not sedimentary, as previously supposed, is encouraging. Between No. 3 level and No. 4 level a fault has been proved, and we may now expect about the same width of lode as at No. 2 level, but with a central section not profitable; this places better aspect on the No. 4 level than the annual report disclosed. Besides the usual considerable excess tonnage, approximately 20,000 tons of low-grade, but easily-milled, ore have been crushed from a new open-cut to the west of the main workings. Nothing definite can yet be stated regarding the limits of this new section, which will be added to ore reserves when totally proved. When the labour position improves, it is intended to prospect for this body at No. 1 level."

* * * *

The Kimberley Reefs Mine and its surrounding geology has recently been reported upon by Dr. Geo. S. Corstorphine, and in view of the opinion expressed by that gentleman, and the more favourable developments which have lately been encountered in the lower levels, the board of the Kimberley (Mashonaland) Gold Mining Company, Ltd., have authorised active development work to be carried out on the lines of Dr. Corstorphine's recommendations, which work, it is anticipated, will take about five months to complete. Mr. A. H. Ackermann, the company's consulting engineer, is of the opinion that the existing ore reserves will enable the present output to be maintained until September, 1917.

* * * *

The *Daily Telegraph* states that the Trade and Industry Committee of the Royal Colonial Institute recently submitted the following resolution to the Governments of the Dominions and Colonial Governments having power to legislate, as well as to Chambers of Commerce, Boards of Trade, etc., in all parts of the Empire:—"That with a view to encouraging the establishment of new industries in the British Empire, and giving a measure of confidence and security to capital to be embarked therein, as well as assisting the expansion of existing industries, the Governments of the Empire be urged to make it obligatory on all Government departments, municipalities, railways, dock and harbour boards, gas, water, and electric light corporations, and all such bodies spending public moneys, or enjoying charters from Government or other public authorities, to purchase Empire-made goods, and to place all contracts with British firms, exceptions to be made, by special permission of proper authority, only in cases where such a course is considered to be at variance with public interests." In forwarding the resolution, it was pointed out that if it were made compulsory in each part of the Empire that Government departments and municipal and other public bodies should place contracts only with British firms, it would prove a very strong factor in stimulating the establishment of new, and the growth of existing, industries, as well as consolidating inter-Empire trade. Chambers of Commerce and Boards of Trade were asked to co-operate in bringing before their Governments the necessity of passing the required legislation to give effect to the principle embodied in the resolution. A large number of favourable replies was received.

* * * *

The report of the Board of Engineers on the best means of providing an adequate extension of the water supply of Capetown was submitted at the last meeting of the City Council. The Board recommends, though with reluctance, that as arrangements could not be made with

**Capetown
Water Supply.**

Wynberg for extended storage on the site of the Victoria and Alexandra dams, a dam should be constructed in Zilvermyn Vallei, in the Muizenberg Mountains, to contain 180 million gallons, at a cost of £200,000. This, however, it is agreed, is only a stop gap: and the Board reiterates the conclusion of its first report that an adequate supply can be obtained only by going outside the Peninsula. Additional storage could certainly be provided on Table Mountain, either by constructing new dams or by raising and strengthening the existing reservoirs, but only to a limited amount and at a wholly disproportionate cost. In particular, the Board condemns specifically and without reservation the plan of raising the height of the wall on the Hely-Hutchinson reservoir. The notion that as a stop-gap scheme this would be cheaper than any other project, is shown by the Board of Engineers' figures to be quite illusory: and, as the Board's report points out, there is the further drawback that tinkering with an existing dam is a much more ticklish matter, when the City is on short rations, than the construction of a new one. As regards the comparative merits of extra-Peninsular schemes, some one of which is indispensable, the Board's report seems to favour Wemmer's Hoek, provided Parliament can be persuaded to modify the conditions of the Bill passed in this relation some years ago, which is extremely doubtful, seeing that the rights or supposed rights of the Paarl Municipality and other riparians are involved. Alternatively, the Steenbras scheme is apparently first favourite.

* * * *

The secretary of the Rhodesia Chamber of Mines writes:—

**Sale of
Antimony Ore.**

"The Rhodesia Chamber of Mines has been in correspondence with the British South Africa Company in regard to the sale of antimony ore in Great Britain, and the following information may be of service to anyone in this country who is considering the shipment of this ore. It was understood that before the war it was most desirable that antimony ore should be free from lead, and that the presence of lead entailed a heavy penalty. It was suggested that antimony was now largely used in conjunction with lead in certain munition work, and that there might be two markets, one for pure antimony where the penalty for lead must necessarily be imposed, and another for antimony containing lead. It now appears from information received from mineral brokers in England, that as regards the penalty for ore containing lead, the restrictions are not so great at the present time, but the difficulty is that even now, owing to those engaged in munition work being accustomed to a certain formula, they dislike using material which varies in quality and prefer having pure antimony to deal with as this has only the same amount of alloy to be added each time. As always happens when the price of ore has risen rapidly, as for example during the Russo-Japanese war, the production of ore is stimulated in all parts of the world in which during normal times it would not pay to produce. The consequence is a fall in price, which at the beginning of this month had dropped to 6s. 6d. and 7s. per unit for 60 per cent. ore, with a penalty of 3d. to 4d. per unit below this figure, and even at this rate the price was not firm."

* * * *

The report for the year to June 30 of the Spitzkop Farm Gold Co., Ltd., states that the ore crushed

**Spitzkop Farm
Gold.**

by the G.H.L. Syndicate was 15,051 tons, giving an estimated yield of £13,425, equal to 17s. 10d. per ton. The company's royalty thereon amounted to £2,033, and a further royalty of £19 was obtained from another tributer, making the total royalty for the year £2,052, but the figures are subject to adjustment owing to war conditions, final account sales not having yet been received. The tributing agreement with the G.H.L. Syndicate expires on December 31 this year, and in view of the termination the board requested their colleague, Mr. John Spiers, to visit the property, and he sailed for South Africa on November 11. The revenue for the year amounted to £2,394. After charging concession dues and all other expenses in South Africa and London there remains a credit balance of £1,199, which reduces the debit balance brought forward to £36,431.

TOPICS OF THE WEEK.

THE GOLDFIELDS YEAR.

A REPORT of the speech made by Lord Harris at the annual meeting of the Consolidated Goldfields Company in London in mail week will be found in another part of this issue. Lord Harris shows that the Rand outlook in some directions is distinctly more promising than it has been for a long time. The Simmer and Jack is improving its position by the acquisition of claims from the Simmer Deep, which is opening up a higher grade of ore, the Jupiter outlook is hopeful, and the developments at the Sub Nigel are excellent. The future of the Robinson Deep-Booyens amalgamation is also of a cheerful character. It was impossible, of course, to avoid reference to the item of depreciation, the main explanation being that the market value of Simmer and Jack shares had perforce to be taken into consideration to meet the views of the auditors. The directors do not regard the excess profits tax with favour, and have submitted their case to the Board of Referees. Gold mining companies ought not to be taxed on the same scale as industrial concerns, for in the former case dividends are largely in the nature of a return of capital, and there is no certainty that they will continue. Shareholders who may have forgotten the circumstances concerning the formation of the present Gold Fields Rhodesian Development Company were reminded that the Goldfields agreed to retire from competition in Rhodesia on condition that the management and control were in their hands. A scheme for the reduction of the capital will shortly be brought forward. In regard to the Far East Rand, the Chairman said: "The whole question of the Far East Rand is one of profound interest. It looks as if the life of gold mining in the Transvaal had been greatly lengthened, and I think we may reasonably hope that in any advantages that arise from that extension of life the Consolidated Goldfields may have an opportunity of benefiting. Up to the present we have made advantageous investments in shares of Government Areas and Springs Mines." The annual report of Mr. C. D. Leslie, Superintending Engineer to the Goldfields, which we print elsewhere in this issue, has the following noteworthy reference to the same subject. He writes: "The remarkably high gold values disclosed by development in the mines of the Far East Rand, especially in their deeper reef horizons, have attracted great attention. On account of these development disclosures the significance is becoming realised of the dormant reef-bearing areas in the district, among the most important of which is the farm Grootfontein No. 152, in extent about 10,000 acres. Your corporation is fortunate in being the principal owner of this farm, which is situated between Springs Mines, having the second richest declared ore reserve of the mines of the Witwatersrand, and the Sub Nigel mine which exhibits distinct signs of enrichment at depth. The indications favour the assumption that some of these dormant areas will eventually develop into gold mines which will be among the most valuable in the world." On matters of general interest affecting the industry Mr. Leslie sums up very succinctly the result of a year's work under unusual conditions. He sets out the following as the chief disabilities that affected the mines of his group as a result of the war:—(1) The temporary loss while on active service of a large number of the most efficient mine employees together with the cost of payments made to them and to their dependents. (2) The higher cost of mine supplies. (3) The payment of a special war bonus of 7s. per week to white employees receiving less than £1 10s. per week, who are married or who have relatives wholly dependent upon them. (4) A further special war tax, imposed by the Union Government of South Africa on the gold mines, of £500,000, of which it is estimated that this group's proportion will amount to about £30,000. (5) Estimated increase of realisation charges in London of 6d. per ounce of fine gold. In concluding his survey he says:—"During the last few years the conditions of labour on the mines of the Witwatersrand have been ameliorated on account of the attention bestowed on the elimination of

dust, on underground ventilation and on health and safety measures generally, and also because of extended annual holiday leave and shorter hours of labour. Nevertheless, the supply of skilled miners from overseas is diminishing rapidly. . . . By doing the actual mining work the native is gaining in skill, and it is obvious that the white miner or supervisor must also make such progress as may be necessary to enable him to command respect and uphold his position. The apprenticeship system for mine mechanics is also greatly in need of revision. The deplorable lack of opportunity for expert training in trades of the white youth of South Africa is a very serious matter which greatly complicates the relative position of the white and coloured people of this country. The subject should be approached with a proper appreciation of the great advantages to be derived in this country from an efficient apprenticeship system sympathetically conducted with the view of reducing to a minimum the ranks of the unemployable and of inspiring respect and happy relationships between employer and employed. Since this was written, the big mine apprenticeship scheme promoted by the Chamber of Mines has taken definite shape. From Mr. Leslie's brief but convincing remarks, it is clear that the scheme has been adopted not a moment too soon.

MINE SIGNBOARDS.

THE bulletin boards placed on the mines of the Rand at the suggestion of the Rand Mutual "Safety First" Committee have proved so successful that they have undoubtedly come to stay. In this connection, it is noteworthy that in introducing "Technical Paper No. 67," on mine signboards, issued by the U.S. Bureau of Mines, the authors state: "The value of warning signs for protecting the general public against dangerous conditions in all walks of life is attested by their general adoption. If warnings of danger are necessary at railroad crossings, excavations, or surface caves, powder magazines, in and around electrical plants, in power houses, and many other places on the surface where man has the benefit of the light of day, it appears that there is all the more necessity for warnings in the underground workings of mines where there is little or no light. A miner is much less likely to approach a powder magazine with an open light or a lighted pipe in his hand if he is advised by a sign that powder is stored near by, and usually he will be more careful in approaching any point where a danger sign is displayed. Under ordinary conditions, if the miner is unfamiliar with the underground workings he will be benefited and will save time if he is enabled to consult a sign that shows him where he is or indicates the way to some certain point. In all large mines there are at times many new employees who need the guidance offered by the signboard, as do even old employees in a new part of the mine. Signs pointing the way of escape to different levels, shafts, or other openings are especially valuable in times of disaster, such as fires, floods, explosions, or the caving of ground. Many mine officials, foremen, or bosses who have spent years at a single mine do not see readily the necessity for mine signboards; because they are entirely familiar with the mine workings it does not occur to them that the average miner can not in a short time acquire the same familiarity with conditions. In the United States to-day both the metal and the coal miners are largely of a roving disposition. Many of them are foreigners who are more or less ignorant of English. As a class they require guidance in the matter of protecting themselves from accidental injury. Mine signboards are in use in many mining districts of the United States. Although in no part of the country has the practice become general, there are isolated mines that have worked out an elaborate system of signboards. There has been no concerted action looking to the adoption of certain universal symbols or signs, although there are manufacturers of signs and some local mining organizations now working toward this end. In considering symbols for universal use it becomes apparent at once that devices or emblems can not be provided to meet all the requirements of a complete system of mine signboards. In order that the symbols may be understood readily by men of

all nationalities it is desirable that the signboards contain as little writing as possible. Although there are many symbols or emblems that may be suggestive of certain conditions in and about mines, it is perhaps better not to attempt to adopt a too extensive system of universal signboards, for such an attempt would result in confusion. The most important requirements to which the authors feel immediate attention should be given are universal symbols denoting: (1) Danger, (2) direction to safety, (3) ladderways. In the course of time, when miners have become familiar with these signs, the system may be developed by various combinations of the three symbols adopted and by the addition of others."

Following upon a moderate recovery in the gross and net profits of Fraser & Chalmers, the well-known manufacturers of mining and other machinery, shown in the accounts for the financial year to June 30, 1915, a much more substantial improvement is exhibited in the results for the succeeding twelve months. And although no dividend is to be paid on the ordinary shares for the fourth consecutive year, the sum added to the balance of undivided profits would permit of a payment of 5 per cent. and still leave the sum carried forward larger than that brought in. The directors have, however, decided, after careful consideration, to carry forward the balance, after payment of the preference dividend, to the current year, in order to conserve the resources of the company required to provide for the large increase in values of stocks and work in progress. A year ago it was reported that the trading for the period then under review had been affected by the war, and difficulties had been experienced in obtaining supplies of raw materials and in maintaining a sufficient labour force, while the costs of materials and labour had considerably increased. It was also stated that to meet the special conditions which had arisen a new and larger power-station had been constructed at the works and some additions had been made to plant and machinery, the expenditure under this head having amounted to £23,507 during the period. Still, the manufacture of steam turbines and turbo-blowers was fully maintained and yielded improved results. Considerable progress had also been made in regard to the manufacture of dredges, and the hope was expressed that the results for the year which had then been entered upon should be as favourable as, if not more so than, the one then lately ended. That hope has been fully realised, for the net profit of £24,469 was rather more than double that of the preceding year. In the latest report the shareholders are informed that the considerable increase in the trading profits was obtained notwithstanding the advance in the cost of labour and materials, the difficulty of maintaining a sufficient labour force, and also the large increase in rates of freights and insurance to South Africa and elsewhere. The works at Erith have been fully employed, and the merchandise business in South Africa has shown substantial improvement, and the prospects for the current year there, as well as at the other branches of the company, are good.

ANSWERS TO CORRESPONDENTS.

All inquiries addressed to the Editor must bear the writer's name and full address. We cannot reply to inquiries by letter, but telegrams with replies prepaid will be answered. Correspondents are requested to write their names and pseudonyms distinctly.

- "Shareholder."—The official statement in this issue answers both your questions.
- "Interested."—Full particulars will not be available until the two special meetings are held.
- "W.F.P."—Your letter has been handed to the secretary of the body in question.
- "Rhodesia."—The address is Box 4, Bulawayo.

PROGRESS OF THE "SAFETY FIRST" MOVEMENT.

Issue of Telling Leaflets for Mine Signboards—Reprint of Extracts from G.M.E.'s Annual Report—Many Activities.

EXCELLENT progress continues to be made with the work of the "Safety First" Committee of the Rand Mutual. The publication and distribution of extracts from the G.M.E.'s annual report dealing with accidents, and the issue of a series of telling leaflets for use on mine signboards along the Reef are amongst the most notable of these activities.

"THE REEF" IN TAAL.

The Prevention of Accidents Committee has also decided to issue a trial number of translation of *The Reef* into the Taal this month. This translation has been carefully made and consists of extracts from recent issues of *The Reef*, in regard to safety matters. The copies are intended for distribution amongst the Dutch workers on the mines who will appreciate them, and if this experiment proves successful, it is possible that further similar issues may be made quarterly.

CONVEYANCE OF EXPLOSIVES TO WORKING PLACES.

This subject has had the very full consideration of the Prevention of Accidents Committee for some time. A few months ago the Mines Department conducted a series of experiments on one of the mines, as the result of which the Acting Chief Inspector of Explosives suggested, *inter alia*, to the Government Mining Engineer that the use of ordinary sacks for the conveyance of explosives to working places should be prohibited, as miners are prone to replace both the sack and any unused explosives in their explosive boxes, and as the sack is usually wet, this not only damages the explosives in it but also the other explosives in the box. The whole matter has since been gone into most carefully by a Technical Sub-Committee, who have given practical trial underground for several weeks to different types of bags, and one (free) specimen bag of a design approved by the Sub-Committee and the Mines Department has been sent for practical trial in each mine. The Sub-Committee recommend the use of this bag for the conveyance of all explosives to the different working places for the following reasons:—The bags are fairly reasonably both waterproof and flame-proof. They have been successfully tried on two representative mines and approved by the officials as well as the working men, indeed the mines on which they have been tried have each ordered a quantity. The price (6s.) is not excessive. Serious accidents have arisen in the past through the use of ordinary sacks for carrying explosives. It is recommended that any man using the new type of sack should be encouraged to bring it with him to the surface. This will tend to prevent the reprehensible practice of placing a damp sack in an explosives box, and will also serve to keep the sack dry.

THE LEAFLETS.

We reprint below a few of the leaflets now being issued by the Committee. It will be seen that their message is forceful and direct.

THE WAR AGAINST ACCIDENTS.

"Our greatest enemy underground is bad hanging! More casualties are due to falls of ground than to any other cause. Over one-third of the total deaths from accidents are due to this cause. Sound advice: When sounding a piece of ground do not trust entirely to the ear, but let the free hand rest lightly upon the rock so that any vibration may be readily felt. In cases where the hanging wall is too high to be reached with the hands then a drill may be used for sounding whilst a charging stick is held in the other hand lightly against the rock. When examining the hanging wall with the eye keep careful watch upon any slip in the rock, and search carefully for any crack which may lead off from such a slip and so loosen a wedge-shaped piece of ground. Be especially careful of any slip and crack through which water is seen to be percolating. The presence of water between a slip or a crack very considerably lessens the cohesion of the rock. In such a case the danger may be

imminent, although it may not be perceptible by either sight or sound. Be on your guard for bad hanging! We must beat this enemy somehow!

USEFUL NEVERS.

"Never run a needless risk to gain a little wealth. Never place a boy at work where you wouldn't work yourself. Never let your gelatine lie careless on the ground. Never lose your temper when you're charging up a round. Never risk a danger, no matter what others say. Never leave till to-morrow what perchance will "fall" to-day. Never forget that "Safety First" is best, when all is said. Never forget one man alive is worth a hundred dead!—By Merlyn, New Modder.

WATCH YOUR HANGING!

"Falls of ground kill and seriously injure more people on our mines than any other cause. This is a true story:—A prominent mining engineer was going round underground and was stopped from going a particular way to a certain working place by the ganger, who told him that the roof there was dangerous, and he'd better go round another way. The ganger was sitting on some sticks of timber. The engineer thanked him and went the way the ganger suggested, and on getting round found the hanging totally unsupported and gaping most dangerously, with two native boys working underneath it, building a pack. He had a short look, then came back the safe way to that ganger, and this is shortly how he put it:—"Quite rightly you warned me not to spend a few seconds under that hanging because it isn't safe, and yet you have two boys who'll work there all day if they're not killed. You've seen that gap and yet allow work to be done underneath it. You keep away yourself, and you are sitting on some sticks of timber which might very well be used as temporary props. You know the danger, for you thought it worth while to warn me, and yet you're supposed to see to the safety of those natives! What do you think of yourself as a miner?" Reader, what do you think of him? You've often seen him no doubt; next time tell him what you think!

THE DECALOGUE OF "SAFETY FIRST."

(1) "Safety First" is thy guardian angel. Thou shalt have no other word before me. (2) Thou shalt not take chances, but thou shalt take care, use caution, and exercise pre-caution. (3) Thou shalt see that "all is clean for safety" each morning in thy person, thy clothes, thy tools, thy machine, thy surroundings. (4) Thou shalt wear thy goggles at thy work at all times. "Glass is made to see through, but thou canst not see through a glass eye." (5) Thou shalt not use a dirty handkerchief or cloth with which to remove particles from thy brother's eye. Lead him at once to the doctor. That is his job—"every man to his own job." (6) Thou shalt have eyes in the back of thy head so that thou mayest see behind thee as well as before thee—danger lurks in every step backwards. (7) Thou shalt take no intoxicating drinks—nor other risks—that thy days may be long in this mine. (8) Thou art thy brother's keeper, so thou shalt guard his safety and interest as thine own. (9) Thou shalt not remove any guard. It is the acme of safety. (10) Thou shalt remember that remorse and regrets cannot re-member thy maimed body. N.B.—These "Safety First" commandments cannot keep themselves—they must be kept; but they will pay for their keep by keeping their keeper in safety."

ELECTRIC WELDING CO., 20, Joubert Street,
C/o Fox Street,
Telephone No. 2661. JOHANNESBURG.

Latest Patent Process for Welding Iron or Steel, Malleable Cast Iron, Manganese Steel and Steel Castings. New Teeth Welded on Steel Gear Wheels without Softening or Distorting the Wheel. Worn Shaft Journals built up to Original Diameter. Torn Keyways Rebuilt, etc. Numerous Crank Shafts Successfully Welded.

THE YEAR WITH THE LUIPAARDSVLEI ESTATE.

Points from the Annual Report.—Striking All-Round Improvement.

THE directors of the Luipaardsvlei Estate and Gold Mining Co., Ltd., in their report to June 30, state that the net profit for the year is £37,341, and with the sum brought in makes £163,099. Since the issue of the last report two dividends have been paid—No. 4, of 9d. per share, in respect of the year to June 30, 1915, absorbing £17,700, and No. 5, of 6d. per share, being an interim dividend in respect of the year to June 30, 1916, absorbing £11,800; and £9,832 has been written off for depreciation, leaving a balance of £123,766. This balance is largely represented by the additions which over a number of years have been made to the general equipment of the mine and to the property, and to that extent is not in liquid form. The directors recommend a final dividend of 6d. per share, less tax, making 1s. per share for the year. The debenture debt has been reduced by £7,985, and the amount outstanding at the date of the balance sheet was £72,000. The net revenue from claim and township licences and other rents and sundry revenue amounted to £10,044. The company's property has been increased by the acquisition of 28 claims, which adjoin the Windsor section on the east. Benefiting by an agreement made in 1902 between the French Rand Gold Mining Co., Ltd., and the Windsor Gold Mining Co., Ltd., relating to a portion of these 28 claims, the company obtained transfer for a nominal purchase consideration. The newly-acquired claims extend the mining area eastwards, on the strike of the reef, by some 750 ft., and their acquisition will, in the opinion of the general manager, greatly simplify and expedite the development of the eastern portion of the Windsor mine. A commencement has been made by extending the 14th Windsor level east, and after passing through a disturbed zone good values have been encountered. Further development is being proceeded with as fast as possible. During the year 256,005 tons of ore were crushed, being at the rate of 12·17 tons per stamp per working day. The average grade of ore sent to the mill was 5·425 dwts. per ton, and the total recovery was 97·62 per cent. of the gold contents. The yield from all sources was 22s. 0·989d. per ton crushed. The average working expenditure was 19s. 0·261d. per ton crushed, which includes a charge for development redemption at 3s. per ton on the tonnage crushed. All repairs, renewals, and general upkeep, as well as the company's contributions to the miners' phthisis compensation and insurance funds have been included in the working expenditure. The tonnage milled is the highest in the history of the mine, and shows an increase of 37,552 tons over last year; the recovery of gold has increased from 96·87 per cent. to 97·62 per cent.; the yield per ton milled is 2s. 2d. higher; working costs at the mine, notwithstanding adverse conditions, show a slight reduction; the profit carried to balance sheet is £37,341, compared with £14,249; the payable ore reserves (fully developed) were estimated at June 30 last at 826,138 tons of an average value of 5·674 dwts. per ton, compared with 702,123 tons of 5·30 dwts. per ton last year; the footage developed during the year has increased by 5,235 ft. In addition to the fully developed ore reserves there are also

partially developed 44,254 milling tons (Main Reef) of an average assay value of 4·89 dwts. per ton, and 83,757 milling tons (South Reef) of an average assay value of 5·4 dwts. per ton. Various additions to plant have been made during the year, the chief item being the underground pumping plant at the 20th level west mine, which will, it is confidently expected, secure the mine against any abnormal increase in water such as was experienced in the previous year.

The report of the General Manager on the results for the year states: 256,005 tons of ore were crushed, yielding from all sources, £1 2s. 0·989d. per ton, total £282,660 5s. 6d.; working expenses, 19s. 0·261d. per ton, total £243,482 14s. 6d.; profit from working, 3s. 0·728d. per ton, total £39,177 11s.; add claim and township licences, rents and sundry revenue, £10,043 19s. 2d.; total profit for the year, £49,221 10s. 2d.

WORKING EXPENSES.

	Amount.	Cost per ton crushed.
Mining	£112,200 3 11	£0 11 1·310
Transport of ore, sorting and crushing ..	7,794 8 3	0 0 7·307
Pumping and baling	7,012 1 0	0 0 6·574
Milling	13,010 18 9	0 1 0·198
Tube milling	9,141 7 9	0 0 8·570
Cyaniding Sands	16,140 4 6	0 1 3·131
Cyaniding Slimes	7,721 3 1	0 0 7·238
Johannesburg Office Expenses	2,061 12 3	0 0 1·933
	£205,081 19 6	£0 16 0·261
Development redemption	38,400 15 0	0 3 0·000
Total	£243,482 14 6	£0 19 0·261

MILLING.

During the financial year under review 60 stamps ran 350·615 days, crushing 256,005 tons, or 12·17 tons per stamp per 24 hours. The average value of the ore milled was 5·425 dwts. per ton, and the gold won by amalgamation was 18,742·298 fine ounces, or 26·99 per cent. of the screen value and 27·65 per cent. of the total production.

TUBE MILLING.

Three tube mills ran 320·069 days, producing 22,536·351 ounces of fine gold, equal to 33·24 per cent. of the total product.

CYANIDE WORKS.

The following are details of the tonnages treated during the year: *Sands*—173,299 tons were treated, equal to 67·69 per cent. of the tonnages crushed. These produced 18,815·685 ounces of fine gold, equal to 2·171 dwts. per ton treated and 27·76 per cent. of the total production. The cost was 1s. 10·352d. per ton treated. *Slimes*—82,706 tons were treated, equal to 32·31 per cent. of the tonnage crushed. These produced 7,695·196 ounces of fine gold, equal to 1·861 dwts. per ton treated and 11·35 per cent. of the total production. The cost was 1s. 10·406d. per ton treated. On the total tonnages treated by the cyanide plant the theoretical extraction was 87·57 per cent., and the actual recovery 88·09 per cent. The total recovery from ore milled equalled 97·62 per cent. of the gold contents.

JAMES WEST & CO.

CERTIFICATED MINING AND MECHANICAL ENGINEERS,
GEOLOGISTS AND METALLURGISTS.

Consulting Specialists in all branches of Diamond Mining,
Washing and Recovery.

Formerly of De Beers Consolidated Mines, Dutoitspan, Wessleton Mines,
Koffyfontein Mines, Premier (Transvaal) Diamond Mining Co., New Eland
Diamonds, Ltd., etc., etc.

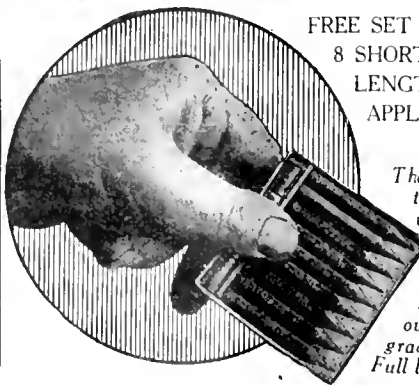
186, Stock Exchange,

Box 4253. Telephone 3659.

JOHANNESBURG.

VENUS PENCILS

FREE SET OF
8 SHORT
LENGTHS ON
APPLICATION.



The "VENUS" Pencil is famous throughout the world. Its unvarying quality, its adaptability to every writing and drawing purpose, its inimitable smoothness and long life are some of the reasons why it is preferred over all others. Made in 17 grades (6B to 9H), price 6d. each. Full length 7".

ONLY ONE BOX TO EACH APPLICANT. WRITE NOW BEFORE YOU FORGET.

"JA" P.O. Box 3166.

JOHANNESBURG.

MINING.

The total rock mined during the year was 334,120 tons, including 14,769 tons hoisted as waste. 62,096 tons of waste were sorted out on surface, equal to 19.44 per cent. In addition to this waste sorted out on the surface it is estimated that another 4.5 per cent. was packed underground. Owing to the improved native labour supply, a greater amount of hand stoping was carried out, resulting in cleaner mining and a reduction of stoping widths from 48.2 inches in 1915 to 46.6 inches in 1916, over the whole mine. Of the tonnage mined 203,058 tons, or 60.8 per cent., came from the Main Reef stopes; 55,157 tons, or 16.5 per cent., from the South Reef stopes; 44,071 tons, or 13.2 per cent., from the Battery Reef stopes; and 31,834 tons, or 9.5 per cent., from development faces.

ORE RESERVES.

A re-estimation and valuation of the ore reserves at the 30th June last shows that there were developed 826,138 milling tons of an average assay value of 5.674 dwts. per ton, and 834,742 tons of an average assay value of 3.383 dwts. per ton. This shows an increase of 124,015 tons in ore reserves, while the average grade is .374 dwt. higher. The increase in value is due to favourable development in all sections of the mine.

FULLY DEVELOPED.

Payable.					Tons.	Dwts. per ton.
Main Reef	...	...	...	...	646,879	5.562
South Reef	...	...	...	...	146,334	5.981
Battery Reef	...	...	...	...	32,925	6.511
					826,138	5.674
Unpayable.						
Main Reef	...	...	...	...	761,014	3.342
South Reef	...	...	...	...	35,678	4.126
Battery Reef	...	...	...	...	38,050	3.494
					834,742	3.383

The above figures for unpayable ore reserves represent the accumulation of many years, while the actual quantity of unpayable rock developed during the year was 97,960 tons of an average assay value of 3.932 dwts. In addition, from areas partly developed there were indicated 44,254 milling tons of Main Reef of an average assay value of 4.89 dwts. per ton, and 83,757 milling tons South Reef of an average assay value of 5.4 dwts. per ton. Ten per cent. has been deducted from all totals for faults, dykes and pillars. *Plant.*—The following additions to plant have been made during the year:—New compressor erected, but not yet completed, owing to non-arrival of necessary parts; underground pumping plant at 20th level West Mine practically complete; European change house, East Battery Reef; additions to manager's house; additions to engineer's house; bathroom and mareu house at both West and East Compounds; one horse; one mule to replace one destroyed.

GENERAL REVIEW

From the foregoing it will be seen that the tonnage milled is the best in the life of the mine, and shows an increase of 37,552 tons over last year. The recovery from the reserves has been excellent. The actual recovery was 5.296 dwts., or £1 2s. 0.989d. per ton, and the working costs were 19s. 0.261d. per ton, a very fair figure considering the increased cost of stores, owing to the war. All repairs, renewals and general upkeep of plant have been charged to working costs, as well as the contributions to the Phthisis Compensation and Insurance Funds. The reduction plant has run well and steadily throughout the year. Our native labour force has been adequate, and has maintained a very steady monthly average. Owing to so many good men joining the forces, it has been difficult to replace them efficiently, especially underground. Average number of whites, underground 118, on surface 99; natives, underground 1,658, on surface 257. The average monthly complement of natives was 1,974. Stoping has been carried on during the twelve months on the following levels:—*Western.*—From 2nd to 21st levels on Main Reef; from 3rd to 21st levels on South Reef. *Eastern.*—From 3rd to 16th levels on Main Reef; from 3rd to 16th levels on South Reef. *East Battery Reef.*—From 1st, 2nd and 3rd levels. *West Battery Reef.*—From 1st, 2nd and 3rd levels. A considerable amount of payable rock continues to be extracted from the old upper workings in all sections of the mine. Of the ore milled: 22.02 per cent. came from the East (Windsor) Section; 61.85 per cent. came from the West Section; 16.13 per cent. came from the Battery Reef (East and West). The Main Reef has shown improved values, while the South Reef remains the same, viz., very narrow and erratic in value. The Battery Reef continues to be erratic in value, and very patchy, and is terribly faulted; consequently development must be kept well ahead.

DEVELOPMENT.

The footage cut during the year was 16,234 feet, an increase of 5,235 feet compared with last year, at a cost of £41,906 3s. 6d., or £2 11s. 7.532d. per foot. Development has been carried out on the following levels: *Western.*—Main Reef, from 2nd to 21st levels; South Reef has been prospected extensively from 1st to 21st level, with encouraging results, and a good tonnage developed. *Eastern.*—Main Reef, from 1st to 17th levels; South Reef, from 1st to 16th levels. *Battery Reef East.*—1st and 2nd levels. *Battery Reef West.*—1st level.

PROJECTED UNDERGROUND WORK.

Most of the work outlined in last year's report has been carried out, and is being continued. For the coming year it is proposed to: *West.*—Sink subsidiary incline and open up levels west, below 21st level; continue 8th, 10th, 12th, and 14th levels east on Main Reef towards main fault dividing the west from the Windsor sections; continue prospecting South Reef. *East.*—Drive 14th, 16th, and 18th levels east into recently acquired French Rand claims. *Battery Reef*

East.—Drive 1st, 2nd, and 3rd levels east and west. *Battery Reef West.*—Prospect on 3rd level and continue 1st level west towards Lancaster boundary. *WEST MINE (MAIN REEF).*—Reclamation has been continued on the upper levels to the west of "D" Shaft, and a fair amount of payable ore obtained. 10th level, East Drive, improved in value during the year, but this area continues greatly faulted. 12th Level East intersected the reef through the big diagonal fault, it being unpayable for a considerable distance. 14th and 15th Levels East have been of good value. Two connections are being pushed from 14th level to 12th level. 21st Drive West: The values have been good and the reef body wide. The stream of water cut is strong, but is under control. *WEST MINE (SOUTH REEF).*—Development on this reef continues to give most encouraging results over all sections of the mine. *EAST (WINDSOR) MINE.*—Various rises have been put through on the east side of the Main Shaft on both reefs, with fair results. 14th, 15th and 17th Levels West, Main Reef, entered a poor zone. 16th Level West has greatly improved, and has exposed a wide reef of good value; it is approaching the main fault dividing the two mines. 14th and 16th Levels East, as diagonal crosscuts, are being extended to develop the faulted area along the French Rand boundary. 11th, 15th Levels East and 16th Level West are opening up good South Reef. *BATTERY REEF WEST.*—1st Level West has continued to give encouraging values. *BATTERY REEF EAST.*—A pipe line conveying compressed air has been laid from the Windsor to this mine, and development has been expedited. 1st Level West is giving most encouraging results, while the Winze 1 East is in excellent values. This has been connected with the 2nd Level. 2nd Level West has been pushed by machines, but has been most disappointing. The drive east intersected the reef, of excellent values, through the large fault, and a connection has been made with the 1st level. The 3rd Level Crosscut, 340 feet vertically below the surface, is being extended south to intersect the reef.

GENERAL.

The whole pumping plant in all sections has been working very steadily throughout the year. Every attention continues to be paid to dust allaying and ventilation of the various sections, as well as to the sanitary conditions both above and below ground. The health of all employees, both white and coloured, has been good. The plantations continue to supply excellent timber for all mine purposes. The new area of 50 acres has been planted with eucalyptus trees, and is coming on very well. The whole mine is now practically being worked on day shift only. The dependents of the men at the front have received £1,279 during the year, and a total of £2,376 since the war started. The employees of the mine have subscribed £1,563 during the year to the various war funds, and a total of £3,281 since the commencement of hostilities. In conclusion I take pleasure in placing on record my appreciation of the good work performed by each and every member of the staff, as well as the general body of employees, during the past year, when, owing to a large number of the regular men being away on active service, a considerable amount of extra work has had to be undertaken by those remaining behind.



Pittsburgh Steel Company
Pittsburgh, Pennsylvania, U. S. A.

Manufacturers of
"PITTSBURGH PERFECT"

Open Hearth Steel Products

INCLUDING

Galvanized Wire Bright Nail Wire
Annealed Wire Bright Hard Wire
Varnished Wire Bright Soft Wire
Bolt and Rivet Wire
Galvanized Barbed Wire
Wire Nails Fence Staples

Pig Iron, Blooms, Billets, Wire
Rods, Hard Spring Coil Wire,
Twisted Cable Wire, Telephone
Wire, Bale Ties, Steel Hoops, Steel
Bands, Cotton Ties and Fabricated
Stock, Poultry and Lawn Fencing.

We are prepared to give PROMPT SERVICE, and solicit
your inquiries accompanied by complete specifications.

Address

PITTSBURGH STEEL COMPANY
EXPORT DEPARTMENT
EQUITABLE BUILDING
NEW YORK, U. S. A.

Cable Address: "PITTSTEEL"

THE YEAR WITH THE CONSOLIDATED GOLD FIELDS.—III.

Points from the Reports of the Directors, Manager and Superintending Engineer.

MR. C. D. LESLIE'S REPORT.

The Superintending Engineer writes:—I beg to present my report on the operation of the Consolidated Gold Fields mines in the Transvaal for the year ended 31st July, 1916. During the period the mines of this group milled a total of 3,832,960 tons of ore, which yielded gold to the value of £3,850,969, of which working expenditure absorbed £2,971,949, or 77.2 per cent., and £879,020, or 22.8 per cent. went to profit. These figures include the Jupiter results since September, 1915, when operations were resumed in the Howard Shaft (Eastern) Section of that mine. For the preceding year 3,387,215 tons of ore realised £3,379,870, divided into working expenditure of £2,455,471, or 72.6 per cent. and profit of £924,399, or 27.4 per cent. The average revenue per ton of ore milled was increased by 1.648d. to 20s. 1.128d., and working costs by 1s. 0.106d. to 15s. 6.083d., so that the working profit per ton was decreased by 10.458d. Working costs do not include special expenditure on plant renewals amounting to £22,661, equal to 1.419d. per ton milled. On account of a greatly improved native labour supply and the resumption of work at the Jupiter Mine, the output of ore was larger by 445,745 tons, although the total actual working profit was lower by £45,379. There was an increase in the cost of mine supplies, charged to working expenditure, of 9.2d. per ton, which represents a sum of £146,930, and further increases in this direction are to be expected during the ensuing year. Under the headings of underground ventilation, dust allaying, support of mine workings, and shaft maintenance, working costs were higher by 3.124d. per ton, equal to £49,892, and this may be taken as some evidence that health and safety measures as well as mine maintenance were not neglected because of war conditions. The expenditure which the mines of this group have incurred during the past few years in connection with the conservation and neutralisation of mine water has been fully justified, and each of our mines has had an adequate supply of water during the dry season.

The following are the chief disabilities affecting our mines as a result of the war:—(1) The temporary loss while on active service of a large number of the most efficient mine employees together with the cost of payments made to them and to their dependents. (2) The higher cost of mine supplies. (3) The payment of a special war bonus of 7s. per week to white employees receiving less than £4 10s. per week, who are married or who have relatives wholly dependent upon them. (4) A further special war tax, imposed by the Union Government of South Africa on the gold mines, of £500,000, of which it is estimated that this group's proportion will amount to about £30,000. (5) Estimated increase of realisation charges in London of £6 per ounce of fine gold. At the request of the Imperial Government the consumption of glycerine in the mines of the Witwatersrand was reduced considerably partly by the substitution of lower grade explosives. The amended Miners' Phthisis Act makes provision for the medical examination of all men wishing to engage in underground work, so as to exclude therefrom those who may have disease of the lungs and respiratory organs or who are otherwise physically unfit for underground work. Men already engaged in mining work have to submit half-yearly to an examination by the officers of the Government Medical Bureau, so that those found to be suffering from tuberculosis may be withdrawn from underground work. In addition to the regular work of sampling for mineral dust, as conducted in the mines of this group, the Chamber of Mines employs a permanent staff of dust samplers for the mines of the Witwatersrand. In this way irregularities are discovered and adjusted. The appliances installed in our mines for eliminating dust are more satisfactory than the attention being bestowed on their use by the underground workmen.

The report of the Commission, appointed in June, 1915, to investigate and report upon the occurrence and origin of earth tremors on the Witwatersrand and means of preventing them, was issued early in this year. The Commission ascribed the origin of these tremors to mining operations and recommended sand-filling or other substantial form of packing as the best means of securing immunity from the shocks occasioned by them.

Strong representation from the Witwatersrand has been made for the suppression of the illicit sale of liquor to natives, and it is hoped that the temptation to engage in this unsavory traffic will be lessened, and that the white and native population of South Africa will be protected from the many evils resulting from it. Means have been suggested for curtailing the large profits which now can be made from illicit liquor dealing and for increasing the risk of detection as well as the punishment of offenders.

The Chamber of Mines introduced a generous scheme of annual holiday leave for mine employees, which took effect from 1st December, 1915. It is expected that this leave will have a good effect on the health of mine workers, and will be of service in minimising the changing of employment which has been exercising a continual check on efficiency. During the last few years the conditions of labour on the mines of the Witwatersrand have been ameliorated on account of the attention bestowed on the elimination of dust, on underground ventilation and on health and safety measures generally, and also because of extended annual holiday leave and shorter hours of labour. Nevertheless, the supply of skilled miners from Overseas is diminishing rapidly. Vacancies are filled by men drawn from South Africa who rank as miners and take charge of native workers, after undergoing a short and very imperfect apprenticeship which consists largely in watching natives at work. Such supervision is proving very costly and unsatisfactory, particularly as so much of it has to be used to replace in a measure the men who are away fighting, and there is great need for the introduction of an improved system of training for underground learners. A step in the right direction has been taken at the Government School for the training of miners, who undergo a two years' course in the work of mining. By doing the actual mining work the native is gaining in skill, and it is obvious that the white miner or supervisor must also make such progress as may be necessary to enable him to command respect and uphold his position. The apprentice system for mine mechanics is also greatly in need of revision. The deplorable lack of opportunity for expert training in trades of the white youth of South Africa is a very serious matter which greatly complicates the relative position of the white and coloured people of this country. The subject should be approached with a proper appreciation of the great advantages to be derived in this country from an efficient apprenticeship system sympathetically conducted with the view of reducing to a minimum the ranks of the unemployable and of inspiring respect and happy relationships between employer and employed. The attention usually bestowed upon experimental work was absorbed in making the best use of the limited materials available for carrying on the mining industry as efficiently and economically as possible under existing conditions. Achievements in this direction are largely responsible for the undiminished flow of gold which continues from the mines of the Witwatersrand, notwithstanding the fact that approximately 3,700 trained mine employees, equal to about 17 per cent. of the total white complement, have left on active service. Since war broke out 723 men left our mines and our Witwatersrand headquarters on active service, of whom 36 received commissions. I have to report that four of the officers and 26 of the men lost their lives in the service of their country. The ranks of the white employees of the mines of the Witwatersrand would have been greatly depleted by a further withdrawal of men for active service if due recognition had not been given to the Imperial importance of maintaining the supply of gold and of continuing the mining industry—the main spring of this country's prosperity—so as to prevent embarrassing South Africa. The men of our mines, a large percentage of whom were not eligible for active service, overcame many difficulties in order to maintain the supply of gold, and in this manner they are contributing to the success in war of Great Britain and her Allies. The remarkably high gold values disclosed by development in the mines of the Far East Rand, especially in their deeper reef horizons, have attracted great attention. On account of these development disclosures the significance is becoming realised of the dormant reef-bearing areas in the district, among the most important of which is the farm Grootfontein No. 152, in extent about 10,000 acres. Your Corporation is fortunate in being the principal owner of this farm, which is situated between Springs Mines, having the second richest declared ore reserve of the mines of the Witwatersrand, and the Sub-Nigel Mine which exhibits distinct signs of enrichment at depth. The indications favour the assumption that some of these dormant areas will eventually develop into gold mines which will be among the most valuable in the world. The Union Government of South Africa has called for tenders for leasing the mineral rights on two Far East Rand areas, one of which is situated on the farm Brakpan No. 16, and the other on the farm Modderfontein No. 17. Your Corporation is fortunate in having secured a substantial interest in Government Gold Mining Areas (Modderfontein) Consolidated, Limited. Recent development disclosures there are very encouraging, and the mine and plant are well laid out for efficient working. This class of investment, when acquired at a low figure, as in the case of your interest in Government Gold Mining Areas (Modderfontein) Consolidated, Limited, is desirable and safe because of the measure of protection afforded by the Government terms of leasehold against reduction in profit.

BARFORD & Co., Ltd. (Late Bull & Oehman, Ltd.)

Scientific and Mathematical Instrument Department.

Large Stocks of Theodolites, Levels, Steel Metallic Tapes and General Surveying Appliances.

REPAIRS of Scientific Instruments a SPECIALITY.

Phone 1221. 59, Rissik Street, Johannesburg. Box 4040.

THE TRANSVAAL GRAPHITE M. & M. Co., Ltd.

W. M. HUDSON, Managing Director.

Foundry Plumbago.—Flake Graphite.—Pipe Jointing.—"Murrella" Boiler Composition.—Graphite Pigment, etc.

Office: 20, Cullinan Building, Johannesburg. Phone 2560.

THE YEAR'S TRANSVAAL GOLD MINE DIVIDENDS.

THE following table shows the dividends declared by Rand and outside gold mining companies to date for the half-year just completed, together with the total rate of

dividends for the year and the two preceding years. The complete list will appear in our next issue.

Company.	June Rate.	December Rate.	On Issued Capital. £	Total Rate% 1916.	Total Rate% 1915.	Total Rate% 1914.
Brakpan Mines	22½	22½	750,000	45	40	30
City and Suburban	6½	6½	1,360,000	12½	13¾	15
City Deep	22½	22½	1,250,000	45	33¾	23¾
Consolidated Langlaagte	12½	10	950,000	22½	25	20
Consolidated Main Reef	6½	5	924,364	11½	12½	11½
Crown Mines	25	25	940,106	50	65	85
Durban Roodepoort	10	10	125,000	20	25	25
Durban Roodepoort Deep	2½	—	410,000	—	7½	7½
East Rand Proprietary Mines	2½	—	2,145,897	2½	11¼	17½
Ferreira Deep	22½	16½	980,000	38¾	42½	75
Geldenhuis Deep	12½	12½	585,753	25	20	18¾
Geduld Proprietary	5	5	970,000	10	10	5
Ginsberg	7½	7½	210,000	15	15	17½
Langlaagte Estate	5	—	886,500	—	15	10
Jupiter	3¾	3¾	1,014,200	7½	—	—
Knights Deep	7½	10	743,526	17½	15	10
Luipaardsvlei Estate	2½	2½	472,012	5	3¾	—
Meyer and Charlton	45	55	200,000	100	80	70
Modder B.	37½	40	700,000	77½	67½	55
Modder Deep	30	37½	500,000	67½	35	—
New Goch	5	5	550,000	10	10	—
New Heriot	35	40	115,000	75	75	65
New Kleinfontein	5	—	1,151,540	5	10	10
New Modderfontein	16½	16½	1,400,000	32½	32½	30
New Primrose	5	5	325,000	10	17½	40
New Unified	10	10	250,000	20	20	20
Nourse Mines	5	6½	827,824	11¼	10	17½
Robinson	4	4	2,750,000	8	14	28
Simmer and Jack	3¾	3¾	3,000,000	7½	10	10
Rose Deep	15	11¼	700,000	26¼	32½	25
Van Ryn	17½	17½	500,000	35	40	45
Van Ryn Deep	20	20	1,196,892	40	32½	25
Village Deep	8¾	10	1,060,671	18¾	21¼	21¼
Village Main Reef	10	15	472,000	25	20	70
Witwatersrand	25	25	469,625	50	50	50
Wit. Deep	12½	10	550,000	22½	28¾	32½
Wolluter	7½	7½	860,000	15	12½	12½
Sub Nigel	5	5	431,580	10	2½	5

The Lonely in November.

The following are particulars of the output from the Lonely Mine for the month of November:—Mill ran 668 hours; crushed 4,810 tons; fine gold recovered, 1,522·032 ozs., value £6,398 9s. 6d.; slimes treated, 4,810 tons; fine gold recovered, 2,855·301 ozs., value £12,005 8s. 2d.; total recovery of fine gold, 4,377·333; total value, £18,403 17s. 8d.; profit, £9,251.

Insiza Mines.

The report of Insiza Mines, Ltd., for the year to June 30 states that the results of operations carried on by tributors during the year were—Gold produced: Nelly, £28,045; Pompeii, £278—£28,323. Royalties received by company, less expenses: Nelly, £4,170; Pompeii, £4—£4,174.

S. SYKES & Co., Ltd., Johannesburg.
P.O. Box 2303. Telegrams: "PSYCHE."

Mechanical and Electrical Engineers.

REPRESENTATIVES OF

POWER & MINING MACHINERY CO., N.Y.

GYRATORY & JAW CRUSHERS FOR ANY CAPACITY.

ALL KINDS OF MINING MACHINERY.

Rhodesian Branches: BULAWAYO and SALISBURY.

HADFIELD'S Ltd.

WORKMEN
EMPLOYED.
ABOUT 6,000.

Hecla & East Hecla Works, Sheffield, England.

WORKS
AREA OVER
110 ACRES.

SOLE MAKERS OF

Hadfield's Patent "ERA" Manganese Steel

The SUPREME MATERIAL for

The Wearing Parts of Stone Breaking and Ore Crushing Machinery, Tramway Trackwork, Mining Wheels, etc.

COMPLETE STONE BREAKING AND ORE CRUSHING PLANTS.

MINING REQUISITES

of all kinds, including Wheels and Axles, Rollers and Frames, Pulleys, Pedestals, Shoes, Dies, Balls, Grizzly Bars, Crushing Rolls, Jaw Faces, Cones, Concaves, etc.

Head Office for South Africa:

46 & 47, CULLINAN BUILDINGS, JOHANNESBURG.

Phone 5900.

Tel. Add.: "HECLA."

Box 1009.

STORES, DENVER, TRANSVAAL (Adjoining Denver Station).

Bulawayo Agents—

WHITMORE & JACKSON,
17 & 18, Agency Chambers.

Salisbury Agents—

P. PEECH & Co.,
Angwa Street.

Natal Agents—

THOS. BARLOW & SONS,
Smith Street, Durban.



WAR CONDITIONS IN CANADA

may have caused a shortage of asbestos, but "PALMETTO" packing will continue to be made only of the first grade asbestos, even though it costs more.

The quality that has made "PALMETTO" famous for long service under hard conditions will be continued.

Let us send you a Sample to prove quality.

GREENE, TWEED & CO.,

Sole Manufacturers,

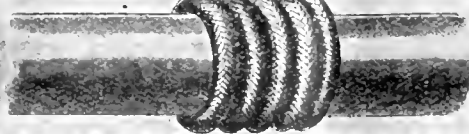
109, DUANE STREET, NEW YORK.

Carried in Stock by—

BARTLE & CO., Johannesburg.

E. W. TARRY & CO., Ltd.,

Kimberley, Salisbury and Bulawayo.



ORE TREATMENT AT THE FALCON MINE (RHODESIA).

[By H. R. ADAM, B.Sc.]

The Falcon Mine, situated at Umvuma, 160 miles from Bulawayo, has now been producing for over two years. Its monthly output being in the neighbourhood of 600,000 lb. blister copper, 3,000 oz. gold, and 6,000 oz. silver. It is the intention of this paper to give an outline of the milling and smelting processes, and to draw points in the practice. From 18,000 to 20,000 tons of ore are treated monthly, and of this quantity 14,000 to 15,000 tons consist of sulphide ore, containing 2½ per cent. copper as chalcopyrite, and 5 to 6 dwt. of gold per ton. The chalcopyrite is associated with iron pyrite and pyrrhotite. In addition, about 5,000 tons of oxidised ore from an "open cut" are treated, containing 0.3 per cent. copper and 4 dwt. gold per ton.

Sulphide Ore Scheme.—The fine and coarse are separated by a grizzly at the main shaft and conveyed by mechanical haulage to the crusher station where the coarse is reduced to 2½ in. ring in three Hadfield jaw breakers. Four trommels with 1½ in. holes again separate into fine and coarse ore, the products passing by belt conveyors to the mill bins. From the coarse ore belt picked ore, amounting to 9 per cent. of the total is sorted for direct transport to the blast furnaces. This contains 5½ per cent. copper and 9 dwt. of gold per ton. The mill is equipped with 36 Nissen stamps, 26 of these being usually employed on sulphide ore, crushing 19 to 20 tons to ½ in. mesh in 24 hours. The stamp product passes directly over 12 "Record" vanners, the concentrate from these being elevated by two bucket elevators to launders conveying to two 30 ft. x 6 ft. concentrate storage vats. The tailing elevated by a 5 in. centrifugal pump passes to the classifying cones for two 18 ft. x 5 ft. 6 in. tube mills. The tube mill product passes over 10 more "Record" vanners, the tailing from which joined by the overflow of the tube mill cones run over blanket tables. From the blanket tables the tailing is lifted by a 6 in. centrifugal pump to cone classifiers, underflow from which is pumped back to the tube mills, overflow flowing to secondary cones preparatory to a partial unwatering for the flotation plant. The result of this "gravity" concentration is the recovery of 1,800 to 1,900 tons of concentrate per month, containing 5 per cent. copper and 19 to 20 dwt. gold per ton. The underflow from the secondary classifiers goes to a sump, the overflow to three 30 ft. x 10 ft. Dorr thickeners. Thickened sand and slime with water in the proportion of 3½ to 1 of solids is then pumped to a steady head box, the flotation oil being added to the pump to ensure thorough mixing. Before entering the first flotation compartment or cell a sample of the feed is automatically cut out. The flotation plant is of the minerals separation type, and consists of nine compartments with agitators revolving at 250 r.p.m., producing a froth in the spitzkastens about 15 in. deep. This froth has a copper content ranging from 13 or 14 per cent. in the first compartment to 3 per cent. or 4 per cent. in the last, so that the froth or "middling" from the last three compartments is returned to the original feed. From 10,000 to 11,000 tons of tailing are treated every month, the feed values being 1.8 per cent. copper and 2.3 dwt. per ton gold; 2,000 tons of concentrate are recovered, containing 8 per cent. to 9 per cent. copper and 5 dwt. per ton gold by the minerals separation unit itself, recovery being about 86 per cent. for the copper and 43 per cent. for the gold. The flotation concentrate gravitates to four 30 ft. x 6 ft. collector vats, where the coarser material settles. The fine concentrate in suspension is run to a 25 ft. x 8 ft. agitator, and thence to two filter presses of the Delme pattern. The coarser settled concentrate is shovelled out at bottom discharge doors, stacked on the surface to dry and then trucked to the smelting plant. The tailing from the flotation plant is automatically sampled before passing to fine collecting vats where slime is separated for transport to the slime dam, the sand being hauled to the dump.

Oxidised Ore.—Ten stamps are usually employed on oxidised ore crushing 25 tons per 24 hours to ½ in. mesh. The product is passed over four tables of the first vanner set, the tailing from these re-ground in a third 18 ft. tube mill, and the product passed over three of the second vanner set and thence over blanket tables. The result is the recovery of 300 tons concentrate monthly, containing 1.5 per cent. copper and 47 dwt. per ton of gold, which is sent to the sintering plant. About 250 tons picked oxidised ore are used up every month in lining the converters. The mill concentration plant recovers about 60 per cent. of the gold and 20 per cent. of the copper while the flotation plant recovers 20 per cent. of the gold and 70 per cent. of the copper, a total extraction of 80 per cent. of the gold and 90 per cent. of the copper by concentration.

Smelting Plant.—The mill concentrate from the collector vats is conveyed by trucks to the sintering plant, where 12 blast roasting pots are in operation. These are hemispherical in shape, 8 ft. in diameter and 4 ft. in height. They are situated on a platform 12 ft. above ground level for convenience in discharging and breaking up of the sintered product. They have a capacity of 8 tons of charge each, and a charge requires about 8 hours' treatment. The charges are made up of:—Mill concentrate, 60 to 65 per cent.; granulated converter slag, 15 to 20 per cent.; fine ironstone flux, 10 per cent.; flue dust, 10 per cent. About 3,500 tons of sinter, containing 14 dwt. per ton gold and 3.2 per cent. copper are produced monthly. Very little of the flotation concentrate is sintered, as its fineness and sticky nature make it unsuitable for the process. The two blast furnaces (one in use at a time) are each 120 in. long and 46 in. in width, at the tuyere level, each furnace taking 300 tons charge in 24 hours with an output of 36 tons of matte in that time. The charges consist of

sinter, picked ore, flotation concentrate and old converter linings and customs ore, with additional flux in the form of limestone and blast furnace returns. The fuel is a mixture of coke and coal. Experiments at the mine proved that up to 50 per cent. of coal could be used safely and with considerable resulting economy. The air blast at about 20 oz. pressure, when smelting is in progress, is derived from two turbo blowers, with a capacity of 12,500 cub. ft. of free air per minute to 30 to 50 oz. per square inch. The matte, containing 32 per cent. to 35 per cent. copper, runs from the forehearth to 8 tons capacity matte ladles, which convey it by electric crane to the converters. One converter is kept in operation, and one as a standby, while the shells of four others are being re-lined. They are of the upright type, of 15 tons copper capacity per 24 hours. They do four "blows" per day, consuming 36 tons matte and producing 12 tons copper. The latter is poured into steel ingot moulds, conveyed on carriages, producing ingots of 360 lb. weight, containing gold and silver to the value of 10 and 20 oz. per ton respectively. Smelting recovery is 96 for the gold and 90 per cent. for the copper. Efficient equipment is provided for the recovery of flue dust from the sintering pots, blast furnaces and converters: the flues from these lead to the main flue, containing two settling chambers from which the flue extends about 900 ft. up the side of a hill to the brick stack, 150 ft. high by 8 ft. diameter. The settling chambers are cleaned out every month, and the main flue once a year. From the foregoing it will be seen that the plan of treatment is on the standard lines adopted at many copper mines in the United States, Australia and elsewhere. In the Transvaal, however, we have little opportunity of seeing similar processes and it may, therefore, be useful to remark on one or two points in the practice. Dealing first with the "gravity" concentration plant it will be noticed that a large proportion of concentrate is obtained after comparatively coarse crushing by stamps. This product is particularly suited for part of the sintering charge. The Falcon Mine equipment contains the first large scale flotation plant in South Africa, and it is of great interest to study the results by it and to see how its introduction affects other parts of the treatment. Obviously, in the case of the Falcon tailing it is not an efficient gold saver, only a little over 40 per cent. of the tailing gold being recovered. No doubt, by altering the details of the flotation scheme, e.g., quantity and nature of oil, introduction of heating and acid, etc., different results might be obtained, but whether a greater gold saving would more than counterbalance the increased treatment cost is doubtful since at present the flotation unit is run very cheaply without heating or addition of acid. Also a greater gold recovery may mean a greater percentage of quartz gangue in the froth which already carries about 40 per cent. "insoluble matter." The flotation results indicate that the gold is not closely associated with the copper sulphide, and since pyrrhotite should also be chiefly in the froth it may be assumed that the gold bearing quartz is fairly well separated from the sulphides by the fine crushing necessary for flotation. In this connection it is interesting to note that at Goldfields, Nevada, where copper bearing gold ores are being worked, slime concentrating tables are sometimes installed after the flotation plant. It is intended at the mine to introduce a "cleaner" unit of six compartments and an Oliver filter for the treble purpose of improving the grade of the flotation concentrate, decreasing its bulk and facilitating handling. The last point is important; the handling of flotation concentrate has proved to be quite a difficult matter in practice, and that this has been the experience elsewhere is seen by the amount of work being done on the subject in America and Australia. It is a problem similar to but of greater complexity than the handling of colloidal slime. The addition of "flocculating" agents might be successful on an experimental scale, but in view of the return of water and oil to the feed, their accumulation in solution might have unlooked-for effects in practice. The effect of the production of large quantities of flotation concentrate on smelting practice is also interesting, since, like other fine concentrate, it is more suited to reverberatory furnace smelting than for blast furnaces. Developments in sintering or in other allied processes preparatory to blast furnace smelting may, however, follow. I have to record my thanks to the Goldfields Development Company of Rhodesia, to Mr. H. T. Brett, General Manager, who has kindly read over and amended these notes, and to Messrs. Tipping, Jeffries and Turner, of the milling, flotation and smelting departments respectively, for the kindly way in which information was given during a short visit to the mine.

* Read before the C.M. and M. Society of South Africa.

BROAD ROBERTS & DODD, C/o Von Brandis & Bree Streets,
JOHANNESBURG.

Mathematical Instrument and Mechanical Accessories Works.

Electrical and Surveying Instruments. Motor Engine Parts. Magnetos.
Meters and Gauges. Munitions. Mica and Emery Manufactory.
All Classes of Light Engineering Work.

Phone 2524.

Box 4777.

SANDYCROFT, Ltd.

(INCORPORATED IN ENGLAND).

SOLE AGENTS:

S. SYKES & CO., Ltd.,
JOHANNESBURG.

Tel. Add.: "PSYCHE."

::

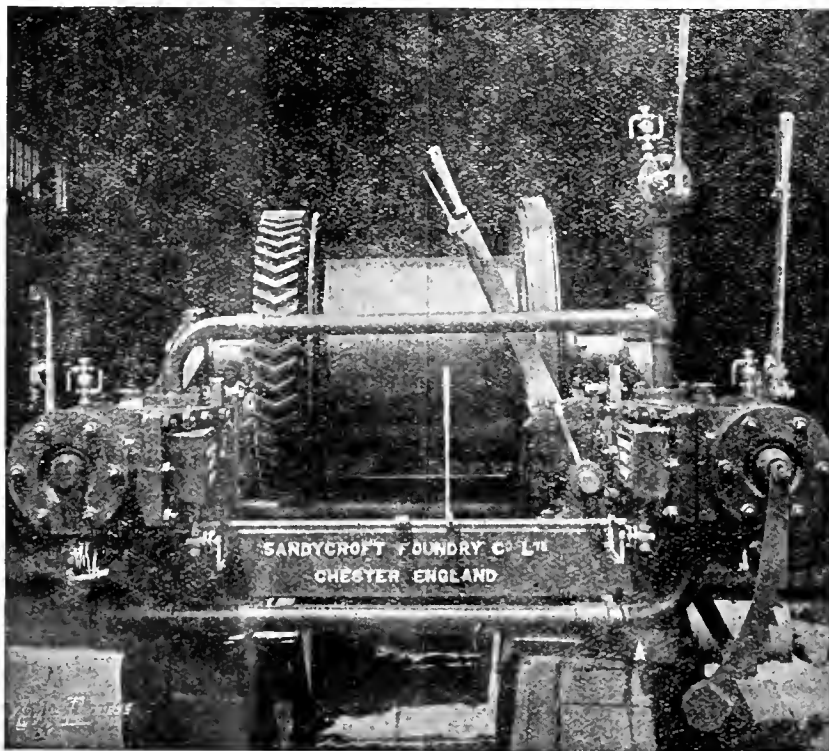
::

P.O. Box 2303.

::

::

Tel.: 2190 Central.



OUR STOCK TYPE OF AIR WINCH.—3 sizes.

Suppliers of Variable-Speed Induction Motors for Winding,
Compressing, Pumping and Ventilation Purposes.

STAMP MILLS & BATTERY SPARES

OF ALL DESCRIPTIONS.

THE WEEK IN THE SHAREMARKET.

A Holiday Tone—Quiet and Featureless.—Recent Favourites Out of Fashion.

THE market, as might have been expected, opened quietly on Wednesday after the holidays. At high change there was very little to call for special comment. African Farms and Knight Centrals both had a spurt, especially the latter. Government Areas were also on the make and closed buyers at the improved price without sellers. Kleinfonteins had an unpleasant set-back, far greater than the passing of the dividend would seem to justify. Randfonteins and Randfontein Deeps both suffered the fate of discredited favourites. Mines Selections were also easier. As to the remainder, there was no change worth noting. The state of the market on Thursday can hardly be called satisfactory, yet there seems to be plenty of money to buy what is wanted, the trouble being that the wants were limited to Modder Bs. and Geduld Props, in the important stocks, and to Main Reef Wests in the low-priced goods. Knight Centrals fell back rapidly after their yesterday's rise. Randfontein Deeps were also easier. It is curious with what persistent forgetfulness of former experiences certain people will rush stocks in the generally vain hope of unlimited stable support. Dealings in outside stocks have been limited to sales of Antimony at 3s. 9d.; buying and selling offers of New Farms at 1s. 7d. to 1s. 8d.; South Van Ryns of 6s. 9d. to 7s.; Daggafontein Options of 7s. 6d. to 7s. 9d.; and buyers only of Randfontein Explorations at 2s.

On Friday morning Modder Bs. were again the only exception to a market further weakened, with sales at £7 9s. 6d. and £7 9s. cash, and £7 10s. 6d. and £7 10s. ex London. Other sales at changed prices were Geduld Props. at 43s. 9d.; Government Areas, 51s. 9d.; Jupiters, 7s. 11d.; Randfonteins, 16s. 6d.; Randfontein Deeps, 7s.; and Springs Mines, 59s. 6d. Kleinfonteins had a bad dressing down with a first sale at 21s. 3d. seven days' buyers option, closing at 20s. 9d. sales and sellers. The New Monte Leone Diamonds are in good demand with buyers at 50s.

	Wed. 20th.	Thurs. 21st.	Fri. 22nd.	Sat. 23rd.	Wed. 27th.	Thurs. 28th.
African Farms	7 6*	7 6*	8 0	—	8 6*	8 6*
Apex Mines	6 3*	6 3*	6 3*	—	6 3*	6 3*
Bantjes Cons.	11 3*	11 3	11 4	—	11 3*	11 0*
Blaauwboosch Dmds. .	75 0*	—	—	—	—	—
Brakpan Mines	95 0*	95 0*	97 0	—	97 6a	97 6*
Breyten Collieries . .	—	17 6†	17 6†	—	—	17 6†
Brick and Potteries . .	—	5 0*	—	—	5 0*	5 0*
British South Africa .	—	12 6†	—	—	—	12 6†
Bushveld Tins	—	—	—	—	0 4*	0 4*
Cinderella Cons. . . .	—	6 0†	6 0†	—	—	6 0†
City and Subs.	37 0*	37 6	38 6†	—	37 9	37 9*
City Deeps	83 0*	85 0†	85 0†	—	84 0	83 9*
Cloverfield Mines . . .	8 6*	8 6*	8 6	—	9 0	8 10
Clydesdale Colls. . . .	12 6*	12 9*	—	—	13 0*	13 0*
Concrete Construction .	2 0†	1 9*	1 9*	—	1 9*	1 9*
Con. Investments	—	18 3*	18 6*	—	18 0*	18 3*
Con. Langlaagtes . . .	29 0†	—	29 0†	—	29 0†	29 0†
Con. Main Reefs	18 6*	18 6*	18 9†	—	18 6*	18 0*
Con. Mines Select. . . .	21 3	21 3*	21 9	—	21 9*	21 9*
Coronation Colls. . . .	—	32 6*	—	—	—	32 6*
Crown Diamonds	3 0†	2 0*	—	—	—	2 1*
E.R. Centrals	—	9 6*	9 6*	—	9 6	9 3*
E.R. Coals	2 0*	2 2	2 5	—	2 4*	2 4*
E.R. Deeps	1 2*	—	1 2*	—	1 2*	—
E.R. Minings	15 0†	16 0†	—	—	15 6†	—
E.R. Props.	—	11 6*	11 0*	—	13 0	12 9†
E.R. Debentures	—	—	£71½†	—	£71½†	—
Eastern Golds	—	1 6†	—	—	—	—
Ferreira Deeps	27 6†	27 6†	27 6†	—	27 6†	27 6†
Frank Smith Dmds. . . .	3 5*	3 7*	3 6	—	3 8	4 0a
	Wed.	Thurs.	Fri.	Sat.	Wed.	Thurs.

	20th.	21st.	22nd.	23rd.	27th.	28th.
Geduld Props.	42 0	42 0*	43 0	—	43 6	44 6a
General Holdings	—	—	—	—	—	8 0†
Glencarns	—	—	1 0*	—	1 0*	1 0*
Glencoe Colls.	10 0*	10 3*	10 3*	—	10 0*	10 6†
Glyn's Lydenburgs . . .	—	15 0†	—	—	15 0†	15 0†
Govt. Areas	49 6*	50 6	50 3	—	51 3	52 0
Jupiters	7 10*	8 0†	7 10*	—	7 9*	—
Knight Centrals	8 2*	8 6	8 6	—	10 6	9 6
Knights Deeps	21 6*	—	—	—	21 0*	—
Lace Props.	5 4*	5 11	6 0*	—	6 2*	6 3
Luipaardsvlei Estate . .	—	—	—	—	8 0†	8 0†
Lydenburg Farms	6 0*	6 9†	6 6	—	6 0*	6 6
Main Reef Wests	3 6*	3 8*	3 9*	—	3 9*	4 9
Middelvelj Estates . . .	1 3*	1 3*	1 3*	—	1 3*	1 6
Modder B's	144 0	145 0†	144 6	—	—	147 0
Modder Deeps	141 0*	141 0*	140 0*	—	141 0	141 0*
Luipoot Tins	13 6†	12 6†	12 6*	—	13 0	12 6*
Natal Navig.	20 0*	20 0*	—	—	—	20 0*
New Boksburgs	1 6*	1 3*	1 8†	—	1 4*	1 8†
New Eland Dmds.	19 0†	19 0†	19 0†	—	—	—
New Era Cons.	9 9*	9 9*	9 9	—	9 6*	10 0†
New Geduld Deeps	5 9*	5 0*	5 9*	—	5 8*	5 8*
New Heriots	45 0†	45 0†	—	—	40 0*	43 0†
New Kleinfonteins	23 3*	23 6*	23 0	—	22 3	22 0
New Modders	—	380 0†	370 0a	—	375 0†	375 0*
New Rietfonteins	1 0	—	—	—	—	0 10*
New Unifeds	11 6*	11 6*	—	—	—	—
Nourse Mines	—	—	22 0†	—	24 0*	20 0*
Pretoria Cements	79 0†	79 0†	79 0†	—	76 6*	76 6*
Princess Estates	2 0†	2 0†	2 0†	—	—	—
Rand Collieries	2 0*	—	2 3*	—	2 0*	2 3*
Rand Klips	9 4*	9 5	9 5*	—	9 5	9 1*
Rand Nucleus	1 5*	1 4*	1 5*	—	1 5	1 5*
Randfontein Deeps	5 9	7 8	8 1	—	7 9	7 6*
Randfontein Estates . . .	16 3	18 0	17 9	—	16 9	16 9
Rooibergs	8 6*	9 0†	8 3*	—	9 0†	—
Roodpoort Uniteds	9 0*	—	—	—	—	—
Ryan Nigels	—	—	2 6*	—	2 6*	2 0*
Shelias	1 0*	—	—	—	1 0*	1 0*
Simmer Deeps	4 0†	4 0†	3 11†	—	4 0†	3 6*
S.A. Breweries	28 0*	28 0*	28 0*	—	28 0*	—
S.A. Lands	4 7*	4 9	4 9	—	4 10	4 8*
Springs Mines	58 9*	61 3	60 3	—	60 3	60 0
Sub Nigels	23 7½	24 0	24 3	—	23 9	23 6*
Swaziland Tins	—	—	—	—	30 0†	—
Rand Selections	62 3*	69 6	63 6*	—	63 0	67 6*
Transvaal Lands	14 0†	14 0†	—	—	—	17 0*
Trans. G.M. Estates . . .	17 6*	18 6*	17 0*	—	17 0*	—
Van Ryn Deeps	69 6*	69 6	69 0	—	69 0	68 9*
Village Deeps	29 0†	29 0†	29 0†	—	28 9†	29 0†
Welgedachts	17 6*	—	17 6*	—	18 6*	19 0*
West Rand Cons.	—	—	6 6*	—	6 6*	—
Western Rand Est.	1 9†	1 9†	1 8*	—	1 9	2 0
Witwatersands	—	—	—	—	54 0†	55 0†
Wit. Deeps	13 6*	19 0*	19 0*	—	20 0*	20 0
Wolbaters	9 6*	9 7*	9 6*	—	9 8	9 7*
Zandvliet Tins	7 6*	7 3*	7 6*	—	7 6	7 5
Union 5 p. c.	£99 16s.*	£100*	£100½	—	£100*	£100*

*Buyers. †Sellers. aOdd lots. bEx London.

PLEASE NOTE.

We are the Largest Buyers of

SCRAP RUBBER

In South Africa.

Enquiries solicited to our Johannesburg Buyers—

JOHANNESBURG VULCANIZING WORKS,

C/o Loveday & Anderson Streets, Johannesburg.

Box 3912, Johannesburg

Or direct to us—

CAPE RUBBER WORKS,

65, Shortmarket Street, CAPE TOWN.

Box 785, Cape Town.

NEW AND UP-TO-DATE FOUNDRY will undertake to supply Castings of every description in Brass, Gun Metal, Phosphor Bronze, and Acid-resisting Metal. Duplicate Orders a speciality.

CENTRAL BRASS FOUNDRY,
49, POLLY STREET,

Quotations on receipt of particulars.

JOHANNESBURG

S.-W. TRANSVAAL DIAMONDS NOVEMBER RETURNS.

The returns from the diggings of the South-Western Transvaal show that the average finds of the past year continue to be made, as the following figures for eleven months prove:—

	Carats.	Value.
January	2,486 $\frac{1}{4}$	£11,818 7 0
February	3,606 $\frac{3}{4}$	20,970 10 6
March	4,011	20,632 16 0
April	3,592 $\frac{3}{4}$	18,165 0 0
May	3,877 $\frac{1}{2}$	20,111 15 6
June	3,461 $\frac{1}{4}$	20,822 6 6
July	3,261	19,533 5 0
August	3,552	20,387 2 6
September	4,291 $\frac{3}{4}$	21,395 2 0
October	3,799 $\frac{1}{2}$	20,761 16 0
November	3,600 $\frac{3}{4}$	20,908 10 0

The producing areas numbered 41, the principal returns being as follows:—

	Carats.	Value.
Kameelkuil	1,255	£7,350 0 6
Christiana	306 $\frac{1}{2}$	2,211 4 6
Bloembhof	377	1,925 10 0
Dievedraai	296 $\frac{1}{4}$	1,769 7 6
London	217	1,382 0 0
Schweizer-Rencke ...	119 $\frac{1}{4}$	897 7 6
Goedehoop	87 $\frac{1}{4}$	642 0 0
Mimosa	111 $\frac{1}{4}$	631 15 0
Koppiesvlei	111 $\frac{1}{4}$	633 11 6
Zeyenfontein	73	118 17 6
Rietput	59 $\frac{3}{4}$	398 10 0
Plessisdam	93 $\frac{1}{2}$	381 17 6
Blesbokfontein	81 $\frac{1}{4}$	331 2 6
Cawood's Hope	38	239 5 0
Leeuwfontein	52 $\frac{3}{4}$	223 2 6
Italie	36 $\frac{1}{2}$	205 0 0
Grootpoort	34 $\frac{1}{4}$	161 0 0
Mooifontein	19 $\frac{1}{2}$	147 0 0
Eerstebegin	26 $\frac{1}{2}$	131 17 6
Grootdoorns	22 $\frac{1}{2}$	125 0 0
Doornbult	26 $\frac{3}{4}$	108 0 0

Notice to Owners and Users of Machinery.

OFFICIAL STATISTICAL RETURNS.

In terms of Regulation No. 153 of the Mines, Works, and Machinery Regulations, framed under Act No. 12 of 1911, owners and users of machinery are hereby called upon to furnish a return of all machinery erected or in use as at the 31st December, 1916.

The forms prescribed for this purpose (K or K1) are obtainable gratis on application to the Office of the Government Mining Engineer, P.O. Box 1132, Johannesburg, or Room 44, New Law Courts Buildings, Johannesburg.

This return must be rendered on or before the 28th day of February, 1917.

The definition of the word "machinery" is as follows:—"Machinery" shall mean and include stationary and portable boilers, steam apparatus, steam and other engines (including locomotives), and all appliances or combinations of appliances which can be used for developing, receiving, transmitting, or converting either mechanical or natural power, but shall not include any locomotives owned or used by the Department of Railways and Harbours.

Failure to comply with this notice renders the owner or user of machinery liable to prosecution.

R. N. KOTZE,
Government Mining Engineer

F. HOPPERT, Only at 86, MARSHALL ST.,
JOHANNESBURG.

ELECTRICAL & MECHANICAL ENGINEERS.

For Magnetos and Electrical Ignitions.

Repairs to Gas Plants and all work requiring the highest skill.

P.O. Box 3503.

Phone 3130.

FRANK E. NOTT, Private Detective.

P.O. Box 1587. 80 & 81, PERMANENT BLDGS. Telegrams: "SLEUTH"

Divorce, Slander, Watching, etc. Delicate negotiations in all parts of the world. Consultations Free.

**Welgedacht Exploration Co.,
LIMITED.**

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

NOTICE IS HEREBY GIVEN that the Fifteenth Ordinary General Meeting of Shareholders in the Welgedacht Exploration Company, Limited, will be held at Salisbury House, London Wall, E.C., in the City of London, on the 31st January, 1917, at noon, for the following business:—

1. To receive and consider the Directors' and Auditors' Reports, the Balance Sheet, and Profit and Loss Account, for the year ended the 30th June, 1916.
2. To confirm the appointment of Mr. J. E. H. Lomas in place of Mr. J. H. Ryan, retired, and to elect two Directors in the places of Messrs. P. G. Hamilton Carvill and L. R. Davies, who retire in accordance with the provisions of the Articles of Association, but are eligible and offer themselves for re-election.
3. To appoint Auditors for the ensuing year.
4. To transact all such other business as may, under the Articles of Association, be transacted at an Ordinary General Meeting.

The Share Transfer Books of the Company will be closed from the 4th to the 31st January, 1917, both dates inclusive.

By Order of the Board of Directors,

O. F. BROTHERTON,

(For the Witwatersrand Township, Estate and Finance Corporation, Ltd., Secretaries).

Head Office:
The Jeppe Arcade, Johannesburg,
28th December, 1916.

**Welgedacht Exploration Co.,
LIMITED.**

(Incorporated in the Transvaal.)

DIVIDEND No. 3.

NOTICE IS HEREBY GIVEN that a Dividend of Two and a-half per centum, (Sixpence per Share), has been declared payable to all Shareholders registered on the 31st December, 1916.

Dividend Warrants will be issued as soon as possible after receipt of the London Transfers.

By Order of the Board,

O. F. BROTHERTON,

(For the Witwatersrand Township, Estate and Finance Corporation, Ltd., Secretaries).

Head Office:
The Jeppe Arcade, Johannesburg,
28th December, 1916.

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

The Holiday Feeling—Brazilian Diamonds—Peace Talk—The New Bank—The Western Reef—The Timber Trade.

The Commercial Exchange will be closed on Monday and Tuesday, January 1st and 2nd, 1917, for the New Year's holidays. The present week, which only started on Wednesday, was a half-hearted affair, as the holiday feeling was much in evidence, particularly as regards the mining trade, as only four of the groups out of seven put out requisitions, and small ones at that. However, there was a little more doing from sources other than the mines, as the railways and municipalities came forward with a few orders, also a decent parcel of Brazilian diamonds came under demand at £14 per carat for a boring outfit for up-country. These are the most expensive diamonds in the world, whereas some thirty years ago anyone visiting the mines could pick them up as a curiosity. The diamond drilling industry has altered all this, and the demand is constant, and great, in Johannesburg, where a large stock is usually kept in stock by the various firms dealing in same. Bridgework was also in demand for the Witbank coal district, to be used early in the New Year. Undoubtedly the peace cables are responsible for a lot of talk throughout commercial circles, and is a disturbing element to the smooth running of business, notwithstanding that it is pooh-poohed. At the quarterly meeting of the Transvaal Chamber of Mines on December 18th, the important announcement was made that an Industrial Bank will be started in Johannesburg, with an initial capital of £100,000, to be subscribed by four mining groups and two banks, for the purpose of fostering local industries. Several merchants and engineers have been approached on the subject of the present banking facilities in Johannesburg and the consensus of opinion is that they meet the requirements from an ordinary commercial standpoint exceptionally well. However, it must be borne in mind that the British banks never take a direct interest in subscribing for shares, or taking interests in trading affairs, or locking up monies in properties, as the fundamental principles of British bankers are to keep their funds in as liquid a state as possible, to safeguard themselves against all possible contingencies. Hence an Industrial Bank is required, to take a direct interest in assisting established industries and factories. For example, suppose a struggling concern requires new and up-to-date machinery, the Industrial Bank might, after investigation, arrange to supply same, pretty much on the hire purchase system. Again, take the case of specialising in manufacturing and engineering works. Since the commencement of the war, these works have more than doubled themselves in number, to say nothing of the expansion of the older concerns. The question will arise, as to whether this abnormal increase will justify itself after the war, when the newer conditions will have to be met. Specialising by expert workmen, who will command high wages, will be one of the first considerations. These high-class and highly-paid workmen must be supplied by the best of tools and the latest machinery, so that they may be given every opportunity as regards their workmanship and output to meet all the requirements of the altered conditions. Here, again, the Industrial Bank may materially assist the position and so enable the present factories to retain much of their well-earned positions, and check the oversea importations. However, it will not be an easy matter for the controllers of the new bank to discriminate as to how far it will be judicious to assist the Johannesburg manufacturers against the oversea competition. For example, take the case of an absolute shortage of a small and apparently an insignificant article required in electrical cable laying, which could be imported under normal conditions at 2s. 9d. per thousand, whereas the lowest offer to-day for hand-making the same in South Africa is 41s. 8d. per thousand. Now, supposing machines were imported to make this particular article, what is to be done with the overplus, as the consumption is very small in the whole of the Union. It is not an easy problem to solve, nevertheless the promoters must be thanked for the interest shown, and what is more, in finding the wherewithal to make a genuine effort to keep more money in the country and retain more work, which is very essential to our well-being.

THE REEF AND ITS PROSPECTS.

An optimistic feeling prevails in reference to trade prospects for the coming year. This optimism is partly associated with the excellent business done during the present year of 1916, and partly in connection with the infusion of new interests in the Randfontein properties, which is expected to inspire and enliven the whole of the Western Rand. For a long while past, the prospective richness of the Far Eastern Rand has overshadowed the Western Rand, therefore anything is welcomed to put more life into that part, as it means much to the mercantile community of Johannesburg. One great thing this new departure has done, is to set at rest and give the pessimists an answer to their repeated question, as to where the money is coming from to further exploit these fields. Now that the two Government Areas have been let with very substantial financial guarantees, and the Randfontein Estates taken in hand, it is an excellent sign as to ample funds being forthcoming whenever the time is ripe for increased activity and expansion.

THE IRON AND STEEL TRADE.

There has been no alteration of late in our standard list of prices, but a hint has been given that a revision will take place early in the New Year, on the advancing side. It is said that all the South African iron smelting works have done remarkably well during 1916, much to the advantage of the proprietors. The general position of the British iron and steel markets continues exceedingly good so far as makers are concerned, and notwithstanding the unabated pressure to supply the British Government more pig iron has been exported. According to the Board of Trade returns the total exports of pig iron for the first nine months in 1916 were 746,681 tons, which is more than double the total accounted for in the corresponding period of last year.

'Phone 4673.

Box 3162.

OSBORN'S

PATENT

"W & S" TUBE MILL LINER

Write or 'Phone for Stock List.

SAMUEL OSBORN & Co., Ltd., SHEFFIELD and JOHANNESBURG.

CHEMICALS.

The business with the Johannesburg whole-sale chemists continues quite satisfactory for household requirements, which is attributed to the fact that such a large number of families has settled in Johannesburg and its suburbs. The mines are doing very little in chemicals, as they have large reserves and only occasionally appear in the local market. According to London advices, the market there has become quieter. Some of the acids are getting easier, notably citric acid, which has fallen about 10 per cent. lately. Sulphate of copper remains firm at about £52 per ton, which quotation is maintained by the reduction in output and the great cost of manufacture. Nitrate of soda is now mainly of interest as an ingredient in the manufacture of explosives. Sulphate of ammonia is much as it was. All lead products remain very dear, but not nearly so dear as they were. White acetate of lead was at 105s. per cwt., but now about 82s. 6d. Nitrate of lead rose to 90s., but can now be had at 65s. The hydrates of potash and soda remain very scarce and dear with only a few outside lots available, for which fancy prices are asked. The export trade is much hampered by lack of licences.

THE TIMBER TRADE.

A merchant's representative states that his firm has had a fairly good year, but he does not think it will be quite so good as last year, because during the past three months business has fallen off sufficiently to become noticeable. In reply to a question as to whether the progress made on the Rand, in manufacturing doors, windows, and such like building material will continue after the war, he said he thought it was an industry which will expand with the latest wood-cutting machinery and expert workmen, whatever happens. Further, he continued, everything seemed to depend on the best machinery, as all workmen, both in Europe and at the coast here, will command high wages. As regards our local market at the present, deals are up quite a halfpenny per foot, simply because the cost is dearer, when they are landed at the coast, and the older stocks have been absorbed. The arrivals are anything but plentiful, therefore that is another reason for the advance, which is not expected to end there.

REVISED PRICE LIST.

Approximate war prices, subject to quick change.—Mining and building hardware: Iron, imported, round up to 1 in., 30s.; 2 in. to 6 in., 25s. per 100 lbs. Ditto, square, up to 1 in., 27s. 6d.; 1½ in. to 2½ in., 23s. 6d.; 2½ in. to 5 in., 25s. Flats, 3-16 in., 37s. 6d.; all from ¼ in. up, 30s. Angles, ½ in. to 3-16 in., 40s.; ¼ in., 35s.; 5-16 in. to ¾ in., 30s., excepting 5 x 4 x ⅝ in.; mild steel bar, 4½ d. lb.; drill, 7 lb.; steel plates, 10ft. by 4ft. by 1-16th in., 35s.; ¾ in., by 3-16 in., 32s. 6d.; ½ in. to 5-16th in., 31s.; ¾ in., up to 30s.; 10ft. by 5ft. by 1-16 in., 36s. 6d.; ¾ in. and 3-16 in., 34s.; ½ in. to 5-16 in., 32s. 6d.; ¾ in., up to 31s. 6d.; intermediate sizes up to 12ft. by 6ft. by 1-16 in., 37s.; ¾ in. and 3-16 in., 34s. 6d.; ¾ in. and 5-16 in., 33s.; ¾ in. and up 32s., all at per 100lb.; hexagon and cuphead bolts, ¾ in. diameter to 2½ in., 55s., over 2½ in., 52s. 6d., ¾ in. to 2½ in., 50s., over 47s. 6d., ¾ in., ¾ in., 1 in., up to 2½ in., 45s., over, 42s. 6d.; nuts, ¾ in., 10d. lb., ½ in., 60s., ¾ in., 57s. 6d., 1½ in., 1¾ in., 62s. 6d., 2 in., up, 67s. 6d.; washers, all sizes, 45s.; rivets, 3-16 in., 1s. 1d. lb., ¾ in., 5-16 in., 10½ d., 7-16 in., ¾ in., 7½ d., ½ in., 45s., ¾ in., 42s. 6d., ¾ in. up, 40s. lb.; shoes and dies, 32s. 6d. to 35s. per 100lb.; rails, £23 per ton; picks, 4lbs., 27s. per doz.; shovels, 32s.

6d. to 50s. per dozen; drill hammers, 5½ d. lb. to 6d. lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 7s., 30 in., 9s. 6d., 36 in., 13s., per dozen; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 10½ d., 11 ft. 11d., 12 ft. 1s.; 26 gauge, 6 ft. to 8 ft., 8½ d.; 9 ft. and 10 ft., 9d.; flat galvanised, 18 to 24 gauge, 35s. to 39s.; 26 gauge, 36s. 6d. 100 lbs.; floor brads, 36s.; ceiling, 40s.; wire nails, 37s. 6d. to 55s. per 100 lbs.; solder, 50 per cent., 1s. 3d. per lb.; locks, rim, 48s.; mortice, 60s. dozen; barbed wire, 26s. to 30s. 100 lb. coil.

Timber: Deals, Baltic, 9 x 3, short and medium, 1s. 1½ d.; longer lengths, 1s. 2½ d. to 1s. 3d. (Oregon, 1s. 1d.); flooring, 1½ x ¾ and 6 x ¾, 6½ d. to 6¾ d. per sq. ft.; do., 4½ x 1½, 9d.; and 6 x 1½, 9d.; ceilings, 6 x ½, 3½ d. to 3¾ d. per sq. ft.; Oregon, 4 x ½, 4½ d.; pitch pine, 8s. per cub. ft.; Oregon, 5s. 9d. to 6s. per cub. ft.; clear pine, ½ in. x 12 in., 7½ d. per cub. ft.; 1 in. x 12 in., 8½ d.; teak, small planks, 14s. 9d. per cub. ft.; do., large, 15s. 6d.; jarrah, 9s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 10d.; scantling, 1s. 1d. to 1s. 2d. per ft., 3 x 9.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland, 9s. 3d. per bag; 8s. 3d., truck loads; lime, white, 7s. 9d.; truck loads, 6s. 9d.; slaked, do., 5s.; blue, 3s. 3d.; plaster lime, 4s.; bricks, stock, delivered, 37s. 6d. to 45s.; wire cuts, 50s. to 70s. pressed, 70s. to 80s. per 1,000, road transport difficult to obtain; salt and white glazed bricks, £27 10s. per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6 ft. plain, 22s. 6d., fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fire clay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw 30s.; boiled, 30s. per 5 galls.; white lead, 70s. to 72s. 6d. 100 lbs.; turpentine, 49s. 2/4 galls.; 10/1, 54s.; coal tar, imported, 10s. to 12s. 6d. per 5 galls.; oxide in oil, 36s. per 100 lbs.; dry oxide, 21s. to 22s. 6d.; S.A. crude oxide, 12s. 6d.; linseed oil putty, 4s. 6d. per 12½ lbs.; bladders, 36s. casks of 100lbs.; grease A.F. axle, 23s. 6d. to 25s. per 100 lbs.; tallow, 1s. per lb.; White Rose paraffin, 17s. 3d. 2/5; Laurel do., 17s.; petrol, 27s. 6d. 2/4; motor oil, 6s. to 7s. 9d. per gall.; engine lubricating oils, 23s. to 36s. 6d. per case; cylinder, 25s. to 40s.; paints in tins, 10d. to 1s. per lb., according to quantity, and if ordered to be mixed, 20 per cent. on pre-war rates. British plate-glass, ¾ in., 3s. 6d.; do., mirror, 4s. 6d.; window, 16oz., 1s. to 1s. 3d. foot.

Chemicals: Mercurry, £20 per 75 lb. bottle; bichromate potash, 3s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 7s. 6d. lb.; alum, 4d. lb.; carbolic acid, 6s. 6d. lb.; borax, 87s. 6d. 100 lbs.; cyanide soda, 1s. 5d. lb.; hypo, 9d. lb.; acetate lead, 70s. 100 lbs.; litharge (assay), 70s. (commercial), 55s. 100 lbs.; zinc sheets and blocks, 1s. 6d. lb.; plumbago crucibles, 5d. per number.

Electrical Goods: Lamps, high volts., British, Holland & American, 16s. to 21s. wholesale, and 21s. to 27s. dozen, retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 5d. to 6d. per yard; 3/20 coils of wire, 25s.; do., 3/22, 21s. 6d.; tubing, 13s. to 14s. 100 ft.; keyholders, 4s. 6d. to 5s. each; round blocks, 3½ in., 3s. 6d. doz.; lamp holder cord grips, 13s. 6d. to 14s. 6d. doz.; switches, 5 amp., 13s. to 14s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 11s. 6d. doz.; do., bobbins, 9s. 6d. to 10s. per 100; cleats, 18s. per 100; P.O. insulators, 18s. motors, 3 h.p., about £30 to £35, new.

MINING EXAMINATIONS.

Study for Certificates as Mine Captains, Mine Managers, Surveyors, Mechanical and Electrical Engineers, and Engine Drivers. Private Tuition and Correspondence Lessons, where personal tuition is impracticable. Practical Mathematics and Electrotechnics. E. J. MOYNIHAN, Consulting Engineer, Cuthbert's Buildings, corner of Eloff and Pritchard Streets, Johannesburg, P.O. Box 2061.

P.O. Box 3901.
Phone 3552.

CASTLE CHAMBERS,
134, Fox St.,
Johannesburg.

The Scientific Instrument Works.
WM. C. LINDEMANN,
Assoc. S.A.S.M.E.

Mining Theodolites and Survey Instruments a Speciality.

All kinds of Mechanical and Electrical Engineering Work Undertaken.

Engineering Notes and News.

ELECTRICAL SYSTEM OF THE RAND POWER COMPANIES, WITH SPECIAL REFERENCE TO METHODS OF OPERATION AND EXPERIENCE.—V.

[By BERNARD PRICE, M.I.E.E., Assoc.M.Inst.C.E., Past-President, S.A.I. of E.E.]

Reliability of Supply.—It is probable that there is no system in the world which has afforded better opportunity for testing the reliability of supply than that under consideration. In addition to the severity of climatic conditions the plant and apparatus installed have exhibited many weaknesses and defects, and although the failure of a protected item of equipment should not in itself affect supply, the case is totally different when the switch called upon to isolate that item fails to do so and explodes in the attempt. To deal with the switch troubles, which have only recently been surmounted, would be outside the scope of this paper, but it may be stated that on many occasions switches have exploded and ignited the oil causing a fire, the effects of which can only be appreciated by those who have witnessed them. Dense smoke rapidly fills every gallery of the switch-house, covering insulators with soot, and involving much delay in the resumption of supply. Even when a serious or prolonged oil fire is avoided, the explosion inside or outside the switch has resulted in a fault on the busbar connections. Interruption of supply may be due to either of the following causes:—(1) The failure of some item of equipment produced by an internal defect or by damage from external cause. (2) Operating mistakes and accidents occurring whilst work is proceeding in proximity to live conductors. Faults, from whatever cause, may be isolated by automatic means, but mistakes and accidents involve risk to life and limb (a much more serious question than security of supply) and can only be prevented by efficient executive control.

Executive Control.—By centring control of all switching operations in a separate department, the risk of mistake through an error of judgment is reduced to a minimum, but for the correct performance of the switching operations themselves reliance must be placed upon a number of less responsible employees. Familiarity breeds contempt, and it is the experience of all power companies that the most careful and conscientious men are liable in course of time to incur unjustifiable risk. To safeguard against mistakes and accidents, most stringent regulations have been enforced, and these may be briefly summarised as follows:—A live chamber is defined as a chamber in which it is possible to touch a conductor or portion of a piece of electric apparatus which is alive and certain specified persons only are authorised to obtain access to a live chamber. No person is allowed to enter a live chamber alone and under no circumstances are natives given access to a live chamber. When work has to be carried out in a live chamber, the Foreman responsible for supervising the work fills in an "Application Form" defining the nature of the work and the time likely to be occupied. This form is then signed by the Foreman and by the Senior Switchboard Attendant, and the latter proceeds to arrange with the Control Engineer for the making dead of the necessary apparatus. When the apparatus has been made dead and the Control Engineer has given permission to hand over, the Switchboard Attendant and the Foreman personally inspect the working place. If necessary, barricades are erected or special watchmen are appointed. When it is agreed that the working place is safe, the Switchboard Attendant fills in a "Permit Form" signed by himself and the Foreman, but the latter is not allowed to give his workmen access to the live chamber until he has obtained the signature of each workman to a "Declaration Form," stating that the nature of the work has been explained and that the risk involved is thoroughly appreciated. When the work is completed and before the apparatus is

made alive, the Foreman fills a "Clearance Form," signed by himself and the Senior Switchboard Attendant, stating that they have inspected the work and agree that it is ready to be made alive. Stringent rules governing the exact procedure to be adopted when making dead or making alive, the issue, possession, and use of keys, and the keeping of records are also enforced. In order to reduce the risk of making accidental contact with a live conductor, and to render a working place evident to the eye, scarlet barrier boards are fixed in front of every high tension cubicle. The removal of any particular board (after the apparatus it guards has been made dead and earthed), creates a gap in an otherwise continuous line of boards along the length of the switch-house gallery.

Automatic Control.—Electrical transmission offers great scope for automatic control because the power is in a form which can produce inductive effects, and thus enable relay systems to be employed. The function of such relays is to isolate a faulty item of equipment as rapidly as possible and, on the scheme in question, the item which most frequently fails is an overhead line, the failure being generally attributable to lightning effects. The differential method of protection in use is assisted in its action by the fact that the neutral of the system is earthed, and the manner of earthing may, therefore, be conveniently considered at this stage. The system naturally divides itself into a number of sections which are insulated from one another, and the neutral point of each such section has been earthed through a non-inductive resistance at one or more points. Whenever possible the neutral point of the star winding of a large 3-phase step-down transformer or generator transformer has been selected for this purpose, but this cannot be done unless the other windings of the transformer are delta connected. If both windings are star connected, telephonic interference results and the neutral point is not held sym-

NO MORE AIR LOSSES.

Pressed Steel
Bronze-Seated

ROCKWOOD UNIONS.

Rustless. - Airtight.

Tested to 1000-lbs. per sq. in.

Sole Agents—Transvaal:

H. ALERS HANKEY,
P.O. Box 3807,
JOHANNESBURG.

Sole Agents—Natal & O.F.S.:

THOS. BARLOW & SONS,
P.O. Box 1011,
DURBAN.

*From Journal of the S.A.I. of E.E. Diagrams and references thereto have to be omitted.

metrical with the phases. Where such large transformers are not available a 3-phase transformer of 1,500 or 1,000 k.v.a. capacity has been installed specially for the purpose, its secondary windings being delta connected. This secondary winding can be used for supplying load, but as the voltage when so connected is non-standard it is only suitable for special service. It will be observed that in several instances one section of the system is earthed at two points. This is advisable for two reasons—firstly, because the section in question is extended in length and, secondly, because it may become separated into two portions at times of emergency. The object of the neutral resistance is to limit the fault current as much as possible, but this current must not be reduced below the minimum value required to operate the cut-outs controlling the sub-station transformers and distribution lines, otherwise the faulty item might not be isolated. If the section of the system is long its impedance from the point of earthing to the furthest boundary may be sufficient to considerably reduce the power on short circuit, and in such case the neutral resistance cannot be made large enough to materially diminish the power which will flow to a fault in the vicinity of the earth connection. Moreover, the greater the impedance becomes the less rigidly is the potential of the extremities of the network held with regard to earth. By earthing at two separate points these difficulties are overcome, and in the event of the section becoming separated between the two earthing points, each separated portion remains earthed through a resistance of suitable value. The water resistances of high value consist of a number of cylindrical earthenware vessels filled with water and connected in series. Those of lower value are in the form of a large tank, about 7 ft. high and 12 ft. in diameter, filled with water and having a submerged terminal of considerable area suspended from an insulator above the tank. All such resistances are placed on the ground within a fence, but are not housed, and it has been found that they do not alter in value by more than 10 per cent. over a period of six months. The metallic resistances are made up of cast iron grids, and have occasionally failed whilst the water resistances have not given any trouble. It is easy to obtain a good earth (always less than 0.2 ohms) at most of the centres, because a water reservoir is available for the purpose. The earthing of the 80,000 volt lines requires special mention. Until recently this section was earthed at Vereeniging only, but for reasons explained later it has been deemed advisable to earth at Robinson also. The transformers at this point were not suitable for 80,000 volt earthing, being delta connected on the 80,000 volt side and star connected on the secondary. No 80,000 volt transformer was available for use as a special earthing transformer, but a 1,500 k.v.a. 3-phase 40,000 volt transformer was connected to the middle points of the delta windings of one of the 80,000 volt step-down transformers, the secondary of the 40,000 volt transformer being delta connected. At all points of earthing a current transformer for operating a recording ammeter is inserted in the neutral connection. This instrument is unable to give a reliable quantitative measurement but it provides useful evidence as to whether an observed fault has been to earth or between phases only. As might be expected almost every fault is to earth though sometimes between phases also. The current normally flowing through the neutral is very small. For example, on the 10,000 volt system with the neutral earthed through 28 ohms at Simmer Pan only, the r.m.s. value of the current was found to be about 1 ampere and the 10,000 volt network

when earthed through 7 ohms gave a neutral current of only 0.2 amperes. When the 40,000 volt system is earthed at two points the neutral current is less than 1 ampere. Oscillograms of the neutral current have shown the presence of harmonics up to the 13th and 23rd and when the 40,000 volt system is earthed at two points even harmonics are prominent, especially the 6th which amounts to 20 per cent. of the fundamental and is in phase with it.

Automatic Protective Gear.—The automatic protective gear is of two kinds, viz., lightning arresters and discriminating cutouts.

Arrester Gear.—The lightning arrester gear is of the simplest type and no attempt has been made to multiply or elaborate such apparatus. Throughout the system (namely, at generating stations, step-down stations and sub-stations), ordinary horn gap arresters in series with water resistances are employed. Fig. 9 gives particulars as to the number of horns, the setting of air gaps and the value of the resistance adopted for the various conditions of service.

Discriminating Cutouts.—The following types of discriminating cutouts are employed:—Generators with their step-up transformers: Differential relays; D.T.L.O. relays (definite time-limit overload relays); Neutral fuse and relay. 80,000 volt transmission lines: D.T.L.O. relays at Vereeniging; Reverse power relays at Robinson. 40,000 volt transmission lines: Differential relays; D.T.L.O. relays. Step-down transformers: Differential relays; D.T.L.O. relays. Outgoing distribution circuits from generating stations and step-down stations: Differential relays; D.T.L.O. relays. All other distribution lines: Differential relays. Sub-station transformers: Differential relays with overload fuses. Sectionalising points on network: D.T.L.O. relays. Radial circuits of minor importance: Inverse time limit overload relays. The differential system depends for its discriminating properties on the fact that a fault between phases or to earth disturbs the balance otherwise existing between the current entering and leaving the damaged conductor or collection of conductors. The entering and leaving currents are made to produce inductive effects in a common secondary circuit containing relays, these latter being merely sensitive instantaneously-acting contact-makers. Under normal conditions these inductive effects balance one another, but when a fault occurs the equilibrium is upset, and a secondary current is caused to flow which operates the relays. The induced effects are produced by current transformers inserted at the termini of the circuit to be protected. When applied to protect a power line the current transformers induce e.m.f.'s, which normally balance one another in the secondary circuit; when applied to protect a generator, transformer or other self-contained piece of apparatus the secondary currents of the current transformers produce opposing magneto-motive forces in a common magnetic circuit having a separate winding to which the relay is connected. In some cases the current transformers normally assist one another in causing a current to circulate in a common secondary circuit, the relay being connected across the secondary circuit instead of in series with it. In these latter cases where the secondary current is normally proportional to the primary current the differential relay may be made to operate also as an inverse time-limit overload relay by inserting small fuses in the secondary circuits. When applied to protect a transformer small fuses are also connected across the relay terminals thereby preventing the relay from operating when the transformer is switched in.

(To be continued.)

MINING INSTITUTE.

TEACHING CENTRES: JOHANNESBURG AND WITBANK.

Prof. YATES prepares candidates for the following Government

Certificates:—

MINE MANAGER'S
MINE OVERSEER'S.

MECHANICAL ENGINEER'S.
ELECTRICAL ENGINEER'S.

MINE SURVEYER'S.

By Class, Private Tuition and Correspondence.

The aggregate percentage passes for the OVER 200 SUCCESSES.

combined classes is nearly 80%

St. James' Mansions, Eloff St.

Box 3807.

'Phone 5892.

DELTA METAL

H. ALERS HANKEY

Sole Agent.

Company Meetings.

CONSOLIDATED GOLD FIELDS OF SOUTH AFRICA.

The ordinary general meeting of the Consolidated Gold Fields of South Africa, Ltd., was held on November 21, at the Cannon Street Hotel, E.C., Lord Harris (the chairman) presiding.

The Secretary (Mr. H. C. Porter) read the notice convening the meeting and the report of the auditors.

The Chairman said: Before dealing with the report and accounts I have, with profound regret, to refer to the recent death of Mr. Charles Rudd, one of the founders of the Gold Fields Company in its original conception, and one of the triumvirate who subsequently organised it on a wider basis. He watched over its affairs, whether in South Africa or in England, with the keenest scrutiny, and when he withdrew from the board he was still always ready to give us his sound advice. His knowledge of mining was very thorough, and his unbounded confidence in the future of the Witwatersrand was proclaimed in his speeches in this hall, which many of you may remember, and which formed a most attractive feature at our annual meetings. Well, gentlemen, there have been ups and downs, beyond human control, as in all affairs of life, but the permanence of the Witwatersrand as a mining field and its still promising future is an eloquent testimony of his unerring judgment. He should be remembered still better, and for far longer, as one of the pioneers of Empire; for it was Mr. Rudd who, at the request of Cecil Rhodes, and accompanied by Mr. Rochfort Maguire, negotiated with Chief Lobengula the concession which formed the basis of the British South Africa Company; and the hardships he endured and the dangers he incurred in bringing back that document form a thrilling story of adventure. Some of us have lost a very trusted friend, some a very old and dear friend; we, the shareholders of the Gold Fields, have all to deplore the loss of a most wise counsellor. But our sense of loss sinks to insignificance when we compare it with the bereavement of his family, to whom I know you extend an earnest and respectful sympathy. While I am on this mournful topic I also report to you, with the utmost regret, the loss by death, shortly after the last annual meeting, of a most trusted official, Mr. Blanchard, who had been registrar for a long term of years.

PROFIT AND LOSS ACCOUNT.

Shall we refer to the accounts as usual? Dealing first with profit and loss account, directors' fees, engineering department, salaries, London, South Africa, and Paris, etc., are this year £12,132 odd, as compared with £12,229 odd last year, showing a very slight difference. There has been a falling off in London revenue, due to increased income-tax and also to smaller revenue from agency fees; but, on the other hand, there have been effected savings on salary and allowances. Subscriptions and donations are £2,230, as compared with £3,614 odd. Debenture interest shows a reduction, of course owing to the drawings. On the other side are dividends, profits, etc., £461,379, as compared with £323,246, but as last year we had deducted for depreciation £97,142, the real comparison is £461,379 odd this year with £420,000 odd last year, showing an increase this year of nearly £41,000, due as to about £12,000 to improved dividends on some of the South African companies and to profits on sales. I should explain that the amounts written off are

the usual items of redemption of office buildings, etc., and do not include depreciation of investments. That gives us to carry down £440,140 odd, to which we add the balance from the appropriation account £80,088 odd, and in order to provide for the depreciation and also to give you a dividend it has been necessary to take from the reserve—or, at any rate, we have thought it the best way of dealing with the matter—a sum of £100,000, giving us £620,228 odd, as compared with £353,623 odd last year. From that we have to deduct depreciation of investments £232,264 odd. This may seem to some a very large amount, considering all that we have written off of late years, and contrasting unpleasantly with the amount written off last year, £97,000 odd. As we have said in our report, it has been necessary to write down such shares, as, for instance, our large holding in the Simmer and Jack Proprietary Mines, in order to fall into line with the market, which takes stock of short lived mines and marks their shares down year by year mainly on account of the wasting factor. In this particular case, though we think this depreciation is more than is actually called for, we are nevertheless obliged to take the market price where quotations are recorded, in order to get the auditors' certificate in the usual form. Of the £232,000 odd an amount of £45,000 is due to our having had to write off certain doubtful loans; otherwise it is the actual depreciation on our investments. Income-tax, South Africa, is, I have no doubt you have observed with regret, a new item, but as it does not apply to the main sources of our South African revenue, it is not likely at any time to become a serious burden. That gives us £231,740 odd to carry to the balance sheet. Capital authorised and issued remains the same, the reserve is down by £100,000, as I have already explained, and is now £700,000. The debentures stand at £125,000, but are at date only £100,000.

SIMMER AND JACK EAST GUARANTEE.

Coming to the Simmer and Jack East second debenture guarantee, during the year we made an offer to purchase the outstanding second debentures of this company, which, as you know, went into liquidation, and the only asset to its second-debenture holders being our guarantee of interest for a term of years. The result of our offer was the acceptance by holders of £93,325 worth, leaving still outstanding the remainder of the guarantee, valued, as stated, at £10,279. Sundry creditors are £131,211 odd, as compared with £216,312 odd last year, the reduction being due to loans to the company having been paid off. The only other item showing any material difference is the contingent liabilities, now £669,875, as compared with £544,701, the increase being due to our share of a joint guarantee with the Central Mining Company in connection with the Booyensens amalgamation. On the other side we have the item of investments. Shares in companies show a decrease from £3,770,651 odd last year to £3,670,510, due to depreciation amounting to £170,646; on the other hand, purchases of investments over sales amount to £70,506. Properties and ventures and investments on account of reserve show no material alteration. Pre-war Stock Exchange loans again show a decrease, being this year £277,252, as compared with £385,763. Sundry debtors also are reduced from £244,651 odd last year to £171,212 this, and cash advances from £809,739 odd to £530,969, due to repayments, in the main by Gold Fields

Rhodesia and Gold Fields American. Real estate and buildings are reduced from £105,887 odd last year to £88,011 odd this. Surplus funds have, as you will see, been invested in Treasury bills to the extent of £126,562 odd. The cash position in excess of all liabilities was last year £1,377,782 odd, and is this year £1,369,830 odd, or a decrease of £7,951. We had to find during the year £150,000 for last year's ordinary dividend, £156,224 for preference dividend and French and South African taxes, and for purchase of investments in excess of sales £71,868, while £45,000 has been written off loans and the debentures have been reduced by £25,000. The result is that we have £231,740 odd to deal with, out of which we have recommended you to take a dividend of $7\frac{1}{2}$ per cent., costing £150,000, but, as you have not to pay income-tax on the dividend, it is, under present circumstances, really equivalent to about 10 per cent.

ASSISTING THE ALLIES.

Turning to general subjects, I concluded my speech last year by submitting to you that in several ways the company had been doing its bit in assisting the Allies in the war, and the opening paragraphs of Mr. Christopherson's report show you how we—and when I say "we" I am not thinking of boards or managers, but of the employees of the mining companies of the headquarters' staff—have continued to give a useful measure of assistance. The provision of gold is, we have been assured, of the highest importance, and Mr. Christopherson shows you that the Transvaal managed to take the highest production on record, equal to 40 per cent. of the world's production. That great production was only possible by the unremitting devotion of the employees of the mining companies to their chiefs and of the staff at headquarters. Many of them would have been glad to have joined His Majesty's forces, but they have recognised that, in helping to win gold, they were assisting the Allies. I feel sure that they, as well as those who have been permitted to join, have your sympathy and approbation. As you will see from the Transvaal report, over 800 employees connected with our business there have joined His Majesty's forces in various capacities, of whom some five per cent. have already laid down their lives for the cause; and in Rhodesia there had, last August, joined the colours over 200 connected with headquarters and the mining companies. You will have noticed from Mr. Christopherson's report that the working costs for the period have gone up 8d. per ton, and this point is worthy of note, in so far as the increased cost of supplies and labour affects mining companies outside the Transvaal.

PROFITS TAX.

The Transvaal companies are not affected by the excess profits tax; their domicile is the Transvaal. They are, of course, affected by the profits tax there, in lieu of income tax, but not by the British excess profits tax, whereas mining companies which unluckily chose to make their domicile in this country are affected. The original idea of the tax was that any excess of profits due to the war should contribute towards the cost of the war—a very reasonable proposition—but this has long been discarded, and the Act now provides that profits in excess of those which were earned previous to the war should contribute, so that whereas a company with a British domicile which was paying a high rate of

dividend before the war contributes nothing if its profits are not increased, unfortunate companies which had no pre-war profits and recently reached their productive stage may have to give a part of the profits they earn to the Treasury; although, as I have pointed out, it costs, in the case of gold mining companies, more to win the gold. That seems to us quite inequitable; and as regards Rhodesian companies we are putting our case as strongly as we can before the Board of Referees—with what result, of course, remains to be seen. At the same time that it is costing more to win the gold, more and more is being demanded from the Transvaal mining companies in provision of comforts for their employees. I am not complaining of these demands; I am only pointing out that from two different directions a minimising effect is being suffered by the profits. The feature of the company's last year's history in the Transvaal was the amalgamation of the Robinson Deep Gold Mining Company, the Booysens Estate, Ltd., the South Deep, Ltd., and the Booysens Freehold, and the view we take is that subsequent events have shown that we were justified in the recommendations which we, the honest broker, gave to the several parties. Owing to influences over which we have no control, such as ground pressure, we have not commenced on the new property one day too soon. I think we may say that a long life is assured to that company.

SUB NIGEL IMPROVEMENT

This year I think the principal feature in South Africa in which Consolidated Gold Fields itself is specially interested is the encouraging improvement on the lower levels of Sub-Nigel, which holds out hopes, long-deferred, of the Farm Grootefontein being of value, and helping at some future day to make up for other properties which by then will be approaching extinction. The plan attached to our report shows the total increased claim area now held by the Sub-Nigel Company and the geographical position of the Farm Grootefontein in relation thereto. The whole question of the Far East Rand is one of profound interest. It looks as if the life of gold mining in the Transvaal had been greatly lengthened, and I think we may reasonably hope that in any advantages that arise from that extension of life the Consolidated Gold Fields may have an opportunity of benefiting. Up to the present we have made advantageous investments in shares of Government Areas and Springs Mines. It is with pleasure that I am able to refer to the distinct improvement in values on the Simmer Deep and to the fact that a contemplated sale of 40 of its claims on its northern boundary to the Simmer and Jack Proprietary Mines will not only give prolonged life to the latter company, but will enable the Simmer Deep to continue active development by means of the cash proceeds from the sale in question.

Another satisfactory feature is the resumption of dividends by Jupiter, whose prosperous future seems reasonably assured for some years to come, and it may be hoped that other sections of the mine besides those at present being worked on this property may lend themselves to profitable operations later on. In both these cases the improved supply of native labour has been the principal cause. Mr. Leslie's report deals at length with the properties in which we are interested, and I refer to it, and will not take up your time by a detailed examination of it.

RHODESIAN INTERESTS.

As regards Rhodesia, we have embodied in our report a brief summary of the full report which we made to our Rhodesian company a few months ago. Since that was issued, and since the general

meeting, at which various suggestions were made to the board, the directors of the Rhodesian board have had several meetings with gentlemen representative of considerable interests in the company, and while having a due regard to your interests, the board of the Consolidated Gold Fields have been able to consent to several changes, which I hope will prove satisfactory to the shareholders of the Gold Fields Rhodesian Development Company; but I may say for your information—for some years have elapsed, and you may have forgotten what happened—that when we consented to the amalgamation we stipulated that we were to have the management and control, and, consequently, we had to stipulate that a majority on the board should be secured to Gold Fields for a term of years—that we were bound to do in your interests. We were prepared to retire from competition altogether in Rhodesia provided your interests were safeguarded, as I have indicated. This was not an unreasonable attitude to adopt, and we should have been altogether failing in our duty to you if we had not insisted upon it, and I hope you will feel we did our duty. Any comments on the year's working in West Africa need not be long; so far as gold is concerned the prospect is not encouraging. In consequence of the war the Government made an excessive demand upon the labour supply by which those mines that are producing gold have suffered, and working costs have there, as in other parts of the world, gone up. On the other hand, tin prospects in Nigeria are distinctly encouraging, and the companies operating there are in a far happier position than those working for gold on the Gold Coast.

Ladies and gentlemen, in our opinion the report we now present is one of the most satisfactory which we have ever submitted to you. The affairs of the company are very wide-reaching, and its ramifications have extended over a far wider field than when I joined your board twenty-one years ago. There have been many criticisms of our policy in taking these risks abroad, but I am very hopeful that the outcome of our efforts to give your shares a broader basis on which to rest will be justified by results, and therefore, with a good deal of confidence, I submit this report for your approval, and move: "That the report of the directors and statement of accounts and balance sheet to June 30, 1916, and the recommendation of the directors, that a cash dividend of 7½ per cent., free of income-tax, be paid on the 2,000,000 ordinary shares of the company, be adopted."

LORD HARRIS CONGRATULATED.
Mr. Stanley Christopherson, in seconding the resolution, said he wished, on behalf of the directors, to tender their very sincere congratulations to the chairman upon his having completed twenty-one years' service on the board. During that period the company had gone through many difficulties, and there had been many problems needing solution; but in tackling those difficulties the chairman had given of his very best to the company, and had always shown that he had but one end in view, namely, the interests of his shareholders. In Lord Harris they had a chairman who had always shown an intense desire that the reputation of this company should in all things be above suspicion. In further remarks the speaker expressed the hope that the fact that Lord Harris had completed his twenty-first year of service he would not regard as a landmark for considering any idea of retirement.

The resolution was carried unanimously, and the retiring directors and auditors were re-elected.

The Chairman said it would be unnecessary on his part if he were not to acknowledge the quite unexpected but very much appreciated tribute of confidence and friendship which had been accorded to him by Mr. Stanley Christo-

pherson on behalf of his colleagues, and which had been so kindly confirmed by the meeting. He could only say that so long as he had the mental activity and the physical capacity to serve the shareholders he could not see why he should contemplate resignation. The shareholders, however, might depend upon this, that directly he felt the burden was becoming so heavy that it would be impossible for him to do what he felt to be his duty to them, it would not be a case of his colleagues coming to him and making any suggestion; he would be the first to recognise that it was time, not necessarily that he should go off the board, but that he should be relieved of some of the heavier burdens attaching to the office of chairman. He desired to thank his colleagues most gratefully for their invariable support and the shareholders for their kind assurance of appreciation.

A cordial vote of thanks to the chairman and directors, as well as to the staff, both in London and in South Africa, closed the proceedings.

SOUTH AFRICAN DIAMOND CORPORATION, LIMITED.

The third ordinary general meeting of the shareholders in the South African Diamond Corporation, Ltd., was held in the Board Room, 2, Cheapside, on December 19, Mr. G. Scott Ronaldson presiding. There were also present Mr. N. F. Marcus and Mr. J. D. Tyson, shares represented personally and by proxy numbering 48,001.

Mr. Tyson read the notice convening the meeting. The minutes of the last annual meeting were taken as read, as also were the directors' report, statement of accounts, and balance sheet. The report of the directors was as follows: Your directors herewith submit for your approval their third report of the corporation for the year ending 30th June, 1916, accompanied by the statement of accounts and the auditors' report thereon. The capital of the Corporation remains the same, i.e., £1,000,000 registered, divided into two permanent directors' shares of £1,000 each and 998,000 ordinary shares of £1 each. The issued capital on June 30th, 1916, amounted to £100,000, i.e., two permanent directors' shares of £1,000 each and 98,000 ordinary shares of £1 each. The diamond industry, with which your interests are so intimately connected, has, despite the crisis through which the whole world is at present passing, shown a decided revival, which has resulted in a considerable improvement in the market for diamond shares. Since the middle of March of this year washing has been resumed with satisfactory results, the profits being equal to those obtained before the war. This company will shortly resume dividend payments. Work has been in progress on a small scale throughout the year, but numbers of diggers are still serving with His Majesty's forces. The company is earning small profits, and, having regard to the huge area over which the alluvial deposits extend, there is little doubt that, given an adequate number of diggers, large and increasing finds will be discovered, with a resulting increase to the profits of this company. Work has been carried on during the whole year, but, in common with the Priels, the shortage of diggers has greatly hampered operations. This company was, however, the first diamond concern to resume dividend payments since the war, but the distribution was only paid out after your present accounts were made up, and will therefore appear next year. During the last few weeks important discoveries of diamonds have been made at Alwal North in the Cape Colony, and your directors have been successful in obtaining certain farms on which alluvial deposits exist. Active prospecting is now taking place, and phenomenally rich patches have been

found in the vicinity, and your directors are sanguine that good results will be obtained from the properties they have secured. Having regard to the interest that has been awakened by the gold mining companies operating in this district, your directors have acquired, on favourable terms, holdings in Brakpans, Springs Mines, and Rand Selections. Your directors and permanent directors have again this year waived all their fees. Mr. G. S. Ronaldson retires in accordance with the provisions of the articles of association, but is eligible, and offers himself for re-election. You will be asked to determine the remuneration of Messrs. P. L. Ellis and Co. for the past audit, and to appoint auditors for the ensuing year.

The Chairman, in moving the adoption of the report, statement of accounts, and balance sheet, said: We all of us doubtless hoped when we met together last year that our third annual meeting would be held under peace conditions. This, however, was not to be, and we are still face to face with the most calamitous war that the world has ever known. It is therefore gratifying to us to be able to present you with a report and accounts of a more favourable nature than we anticipated, and to be able to hold out fairly sanguine hopes of quite a different state of affairs next year. The diamond trade has been most remarkable during 1916, and the last few months have witnessed enormous business in all classes of goods. America has, as usual, been the principal buyer, but a large volume of trade has also been done with Russia, India, and the Far East. With depleted stocks in the hands of the big merchants, and with only the largely reduced amounts coming from the River Diggings, it was not to be wondered that the dry mines should recommence working. De Beers, Jagersfontein, and Premier Mines are now producing, and at the Blaauwbosch, in which we are so largely interested, washing has been in progress since March. The demand, however, has been so phenomenal for diamonds that prices have risen above pre-war rates, and are at present round about 20 per cent. higher than formerly, and as the producers appear to be sticking to the policy of strictly limiting supplies, the outlook for the trade is particularly bright. These factors have contributed to the rise that has recently taken place in diamond shares, and as all the producing mines must now be earning big profits, it is anticipated that a large further appreciation of values will be seen. This is most gratifying to us as holders of diamond shares, and although pre-war values have not been realised yet, our holdings approximate at today's valuations very nearly cost price, and we have good hopes that within the next six months the margin will be on the right side. As you will have seen from the report, we have acquired substantial interests at Aliwal North. It is too early to appraise these interests, but valuable alluvial deposits have been discovered on other farms in the district.—Mr. Marcus seconded the motion, which was carried.

It was resolved that Mr. G. S. Ronaldson, who retired in terms of the articles of association, be re-elected a director. It was further resolved that Messrs. P. L. Ellis and Co. be reappointed auditors for the ensuing year, and that the question of their remuneration be left in the hands of the directors. There being no further business, a vote of thanks to the chairman terminated the proceedings.

BLAAUWBOSCH DIAMONDS, LTD.

The seventh annual general meeting of shareholders in the Blaauwbosch Diamonds, Limited, was held in the Board Room, 2, Cheapside, on December 19th, Mr. G. Scott Ronaldson presiding. There were present: Messrs. N. F. Marcus, M.

M. Aaronson, C. W. Bodley, and the Secretary, J. D. Tyson. Share representation personally and by proxy numbered 17,511. The Secretary read the notice convening the meeting, and the minutes of the last annual meeting were taken as read, as were also the directors' report, statement of accounts, and balance sheet.

The directors' report was as follows: Your directors herewith beg to submit for your approval their seventh annual report and audited accounts for the year ended 30th June, 1916. The nominal capital of the company is £24,500 fully issued. The company owns 100 morgen freehold under the title of "Catherine's Fancy," being a portion of the farm "Blaauwboschfontein," No. 229, District Boshof, O.F.S., and six-tenths of the mining rights over the said 100 morgen. Our lease of the Government's four-tenths share was renewed for a further period of six years as from 30th May, 1915. The Manager, in his report, deals with the work done during the period under review. Your directors were successful in disposing of the company's production at a satisfactory price. The mining revenue and expenditure account shows a profit of £3,641 4s. 10d. for a period of twelve months ended 30th June, 1916.

The balance to credit of profit and loss account at the 30th June, 1915, was	£285 5 11
Add balance to credit 30th June, 1916	3,641 4 10
Plus licences refunded	21 0 0
	£3,947 10 9

This amount has been dealt with as follows, viz.:

To profit tax to 1914	£1,517 19 6
To interest account	203 9 10
To funds appropriated to capital expenditure during the year	342 13 0
	£2,063 2 4

This leaves a balance of £1,883 8s. 5d., which is carried forward	1,883 8 5
	£3,947 10 9

Messrs. D. MacGill and N. F. Marcus retire in terms of the articles of association, and, being eligible, offer themselves for re-election. Mr. F. J. Gardiner, auditor, retires, but offers himself for re-election.

The Chairman, in moving the adoption of the report, statement of accounts, and balance sheet, said: When we met in December of last year our mine was closed, consequent on the greatly diminished demand for diamonds. I then remarked that it was our intention to resume mining operations at an early date. Your directors have always kept in view the safety of the mine as an opencast proposition, and although it would have been possible to produce at an earlier date, we did not think it advisable to take any risks, and before resuming the hauling of blue a large amount of reef was cleared, and the mine put in a thoroughly satisfactory state; owing to this we did not wash until towards the end of March, so we had only three months of profitable work during the year which closed on the 30th of June last. In spite of this we finished the year with a small profit. As we had to provide for the major part of the £2,300 awarded the Government for profit tax, legal expenses in connection with this, amounting to over £700, interest on overdraft, relief payments, and the cost of keeping the machinery, etc., in order, besides the considerable expense of cleaning the mine, I think you will agree with me that we have reason to congratulate ourselves on the position. For some time past we have thought it desirable that we should instal a more powerful engine, and as a 170 h.p. Tangye was put up for tender by the Corporation of Capetown, we decided to tender, and were successful in securing the engine. At present

we are running two Davy Paxman gas engines, which develop between them about 110 h.p. The work of erecting the engine is now nearing completion, and we have every reason to hope will be entirely satisfactory. Our Manager and his staff, as also our Secretary, have all loyally laboured to render our operations successful. In conclusion, as our operations have continued to prove satisfactory, I have pleasure in announcing that your directors have decided to declare a dividend of 5s. per share, being at the rate of 25 per cent. on the capital of the company, payable to all shareholders registered on the 31st of this month. The transfer books of the company will be closed from the 1st to the 8th January, 1917, both days inclusive. I now beg to move the adoption of the report and balance sheet.—Mr. Aaronson seconded, and the motion was agreed to.

On the motion of Mr. Aaronson, seconded by Mr. Bodley, the retiring directors, Messrs. MacGill and N. F. Marcus, were re-elected.—Mr. Bodley moved, Mr. Aaronson seconded, and it was resolved, "That the remuneration of the auditor for the past year be left in the hands of the directors, and that Mr. F. J. Gardiner, the retiring auditor, be re-appointed for the ensuing year." There being no other business, a vote of thanks to the chairman for presiding terminated the proceedings.

PNIELS, LIMITED.

The third annual general meeting of shareholders in Pniels, Limited, was held in the Board Room, 2, Cheapside, on December 19th, Mr. G. S. Ronaldson presiding. There were present Messrs. M. Aaronson, N. F. Marcus, and the Secretary (Mr. J. D. Tyson). The manager, Mr. A. Cohen, was also in attendance. Shares were represented personally and by proxy to the number of 64,030. The Secretary read the notice convening the meeting. The minutes of the last annual meeting, as also the directors' report, statement of accounts, and balance sheet were taken as read. The directors' report was as follows: We have pleasure in submitting for your approval the third report of the company, together with the audited balance sheet and profit and loss account for the year ended June 30, 1916. The authorised capital remains at £125,000 in 125,000 shares of £1 each, of which 100,000 are issued and fully paid. The gross revenue for the period under review amounted to £5,281 11s. 11d., and the expenditure to £3,087 11s. 6d., leaving a profit of £2,194 3s. 5d. for the year, which reduces our balance to the debit of profit and loss account to £1,495 3s. 6d. All matters concerning the working for the year are explained fully in the manager's report. Messrs. D. MacGill, G. S. Ronaldson, and N. F. Marcus retire in accordance with the articles of association, but, being eligible, offer themselves for re-election. Mr. F. J. Gardiner, auditor, retires, but offers himself for re-appointment.

The Chairman, in moving the adoption of the report, accounts, and balance sheet, said: Owing to the revival in the diamond business we closed our financial year in a more satisfactory position than anticipated at our last annual meeting. The period under review shows a profit of £2,194 as against £270 to June, 1915. Owing to the large amount written off in 1914 we still show a balance to the debit of the profit and loss account, but we have every reason to hope that the position will be reversed before we next meet. Considering the handicap your company, in common with all other concerns of a similar nature, has laboured under during the year, and the fact that a large percentage of our diggers are still at the front, we have no reason to complain. The

total price realised for our diamonds in 1914 was £28,000, the average per carat being £5 5s. 5d.; in 1915 our sales were only £13,500 at an average price of £4 4s.; and for the period covered by the present report the sales were £26,500, at an average of £5 9s. 7d., so we recovered very close to our total of 1914, and the average price was 4s. 2d. better. As indicated in my remarks when we last met, your directors intend to follow the line of caution, and in pursuance of this policy a further sum of £3,000 was placed on fixed deposit, which item now stands in the balance sheet at £15,000; since closing the financial year £2,000 more has been added. Our thanks are due to our manager, Mr. Cohen, and his small staff for their conduct of the local affairs of the company under adverse circumstances, as also to the secretary for his hearty co-operation. I now beg to move the adoption of the report and balance sheet.—Mr. Aaronson seconded the motion, which was carried.

On the motion of Mr. Aaronson, it was resolved that Messrs. David MacGill, George Scott Ronaldson, and Norman F. Marcus, the retiring directors, be re-elected. Mr. Aaronson moved, and it was resolved, that the remuneration of the auditor for the past year be left in the hands of the directors, and that Mr. F. J. Gardiner be reappointed for the ensuing year. A vote of thanks to the chairman for presiding terminated the proceedings.

NEW THOR DIAMOND MINING COMPANY, LIMITED.

The sixth ordinary general meeting of shareholders in the above company was held in the Board Room, 2, Cheapside, on December 19th, Mr. G. S. Ronaldson presiding. There were present: Messrs. N. F. Marcus, M. M. Aaronson, G. R. Benford, C. W. Bodley, and the secretary, Mr. J. D. Tyson. Shares to the number of 54,450 were represented personally or by proxy. The secretary read the notice convening the meeting. The minutes of the last annual meeting were taken as read, as also were the directors' report, statement of accounts, and balance sheet. The directors' report was as follows: Your directors herewith beg to submit their report for the year ended June 30th, 1916, together with audited balance sheet. Owing to the continuance of the war it has not been possible to effect arrangements for the resumption of mining operations. In terms of the articles of association all the directors retire, but being eligible, offer themselves for re-election. You will be asked to appoint an auditor for the current year. The retiring auditor, Mr. F. J. Gardiner, offers himself for re-appointment.

The Chairman, in moving the adoption of the report and accounts, etc., said: It has not been found possible during the year under review to resume mining operations, nor does it seem likely that we will be able to during the current year. It is advisable to husband our resources until times are more settled. Mr. Byrne, our manager, has acted as caretaker at a small salary, and our thanks are due to him for safeguarding the company's effects at the mine. I mentioned when we last met that we were endeavouring to arrive at a compromise with Mr. Daubney. This was reached after the question had been submitted to arbitration, and accounts for practically half the year's expenses. I now beg to move the adoption of the report and balance sheet. Mr. Benford seconded the motion, which was carried.

On the motion of Mr. Aaronson, seconded by Mr. Benford, it was resolved that the retiring directors be re-elected. On the motion of Mr. Benford seconded by Mr. Aaronson, it was resolved: "That

the remuneration of the auditor for the past year be left in the hands of the directors, and that Mr. F. J. Gardiner be reappointed for the ensuing year." A vote of thanks to the chairman terminated the proceedings.

FRASER AND CHALMERS.

The ordinary annual general meeting of Fraser and Chalmers, Ltd., was held on November 23rd, at Winchester House, Old Broad Street, E.C., Mr. A. W. Tait (the chairman) presiding. The secretary (Mr. F. G. Palin) having read the notice convening the meeting and the report of the auditors, the Chairman said: The net profit, after providing for all expenses and depreciation on buildings, plant, and machinery, was £24,668, as compared with £12,058 for the previous year. The profit is therefore more than double that of the previous year, and the figure stated is after making provision for taxation. The progress which the company has shown during the last four years has been most satisfactory, and we can congratulate ourselves that, notwithstanding the many difficulties which surround manufacturing and trading interests at the present time, we have been able to make such good progress. The results for the period show a considerable increase over those of the previous year, and the satisfactory feature, so far as the Erith Works are concerned, is that the increase is not only shown in money value, but also in actual tonnage of output, notwithstanding the difficulty of obtaining and retaining a sufficient labour force.

PROGRESS IN STEAM TURBINES.

The progress in the manufacture of steam turbines and turbo-blowers has been still further increased, and the position of the company is now an important one in the trade. The policy of the board includes a programme of development by which we hope to maintain a leading position in turbine work. Turbines of over 5,000 kilowatts have already been built, and still larger units are being prepared. There is every reason to believe that this department, which is now so thoroughly established, should continue to grow and expand in a most satisfactory manner. The coal-conveying and coal-handling department is also showing a most healthy expansion. Last year I mentioned that substantial orders had been obtained from the French Government and also for South Africa and China. The erection of these plants is proceeding satisfactorily, although some are delayed owing to the difficulties of the freight situation. One of the plants in France, however, has been in operation for some time, and has been accepted and admitted as exceeding guaranteed capacity, and as being in every way satisfactory. In consequence of this, further substantial orders have been received. The satisfactory operation of other plants which have been erected, particularly in this country, shows that the company's designs and plant are meeting with general acceptance, and there is every reason to believe that this department will become one of the most important in the company's business. Large orders have also been obtained for dry gas cleaning plants for important iron-works throughout the country.

IMPROVEMENT IN SOUTH AFRICA

The business in South Africa has shown substantial improvement, and the results obtained are satisfactory, particularly when we bear in mind that provision has now to be made in respect of these profits for South African income tax. It was necessary to place a large number of orders for supplies required by the mines, and for other material, in the United States, and the results are all the more

satisfactory when we take into account the increased costs of materials and the heavy charges for freights and insurance, apart altogether from the difficulties and delays which occur in obtaining the necessary transportation. The trading in Australia and also in Canada has necessarily been restricted during the year. In regard to Russia, we have established an office in Petrograd, and our representative (Mr. Catlin) has been busily engaged in making our name and manufactures known to prospective users there. We have already received several orders for turbines, and there is every promise of a large business to be done in this line of machinery, and also in the other branches of the company's manufactures when monetary conditions improve. We are at present in negotiation with a certain well-established Russian firm, with a view to working in conjunction with them for the development of certain trade in that country. One of the company's representatives made an extended tour in China and the East, and has been successful in obtaining substantial orders, and also in strengthening our connection there, which will be invaluable to the company. The large power station which was erected at the works at Erith has operated satisfactorily, and has been the means of effecting considerable economies.

DIVIDEND PROSPECTS.

After reviewing the accounts, the Chairman continued: In the ordinary course, had conditions been normal, the directors would have been pleased to recommend a dividend upon the ordinary share capital of the company, which the profits justify; but it was decided to carry forward the whole of the balance of profit to the current year. The reason which guided the directors was the large increase in the value of works in progress and stocks at the various branches. There is no immediate prospect of any reduction in either of these items. It is therefore of the utmost importance in these times for the company to retain all the financial resources possible at this end. Immediately this position is relieved the directors will be pleased to consider and to recommend, if possible, a distribution to the shareholders. With regard to the current year, I am not going to make any definite statement, because every known condition has been upset by these abnormal times; but I can say, by way of encouragement, that the order book gives every indication that the present year will give results as good as, if not better than, those which we have the pleasure of submitting to you to-day. I have received one or two letters from shareholders requesting the directors to take into serious consideration the question of splitting the £3 shares into shares of £1 each. The matter has been duly discussed by the board, and they are prepared to accede to that request, and will in due course call the necessary meetings to give effect to it. I now move: "That the report and accounts for the year to June 30, 1916, be, and they are hereby, received and adopted."—Mr. R. T. Bayliss seconded the motion, which was unanimously adopted.

The retiring directors (Mr. W. J. Chalmers and Mr. H. F. L. Orentt) and the auditors (Messrs. Deloitte, Plender, Griffiths and Co.) were re-elected, and a vote of thanks to the chairman, the managing director, the directors, and the various staffs concluded the proceedings.

S.A. ALKALI, LTD.

The fourth ordinary general meeting of shareholders of the S.A. Alkali, Ltd., was held in the board-room, Consolidated Buildings on December 21, Mr. H. J. Edwards presiding. The number of shares represented personally or by proxy amounted to 9,817.

The Chairman in moving the adoption of the directors' report, balance sheet and profit and loss account for the year ended 30th September, 1916, said that the company had been started in a depressed time. Their product, although well known to be of great value, did not occur in commercial form, and the problem before the board was to bring that product into marketable condition, and at the same time to find a market for it. He was pleased and gratified to be in a position to state that the company, which had had its full share of preliminary troubles, had surmounted them, and was now in what might be described as prosperous circumstances. At September, 1915, they showed a profit on working of £3,535 0s. 2d.; at September, 1916, a profit on working of £6,342 9s. 3d. So far, they would readily admit that this was a satisfactory record. The trouble had been, however, that they had been

under-capitalised. The growing needs of the business could only be met by considerable increases and improvements to their plant. Their capital being exhausted, these payments had to be made out of profits. Similarly money had been lost in experimental works undertaken in the early stages of the company, and these and other depreciations had also to be met out of profits. This year, out of a gross profit of £6,342, they had written off for necessary depreciation a total of £1,896, and carried forward a balance of profits of £4,331.

That balance which they carried forward was equal to a dividend of 17 per cent. on the shares. And, had they not been under-capitalised, they could, and would, have recommended the declaration of a substantial dividend. During the present year the Board had obtained from the shareholders in special general meeting powers to create subsidiary companies,

whose objects would be to exploit certain offshoots of their business. His idea in doing so was that the capital should not be inflated by the addition of the monies necessary for purposes not directly attaching to the trade to which they had hitherto confined themselves. But the prospects of that trade were largely in the direction of expansion. They had in contemplation to call the shareholders together shortly, to decide, inter alia, whether they would prefer to provide the necessary outlay for that expansion out of current profits, or whether they would increase the capital of the company, and so enable the Board to distribute those profits in the form of dividends.

The report and balance sheet were adopted.

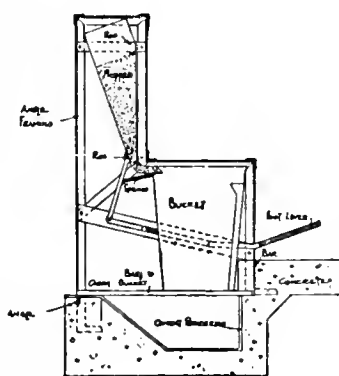
The retiring directors, Mr. J. T. Windram and Mr. R. Connell, were unanimously re-elected. Mr. Frank A. Stokes was re-elected auditor, jointly with Mr. E. E. Roberts.

The report of the Selukwe Columbia for the year to June 30 states that the Wonderland mine ore reserves at June 30, 1916, amounted to 22,214 tons, of an average assay value of 10.57 dwts. per ton, as compared with 25,106 tons of an average value of 11.51 dwts. per ton at June 30, 1915, a reduction of 3,892 tons on the year, after allowing for 17,325 tons crushed during that period. The developments during the year may be considered satisfactory, notwithstanding the slight diminution in the total of the ore reserves. The reduction plant treated 17,325 tons, from which 7,627.53 ozs. of fine gold were recovered, of a value of £31,814. Working costs amounted to £27,660, leaving a working profit for year of £4,154. In addition some

73 tons of concentrates were on hand at June 30, 1916, valued at £382. The question of laying down plant to treat the accumulated and current slimes is now under consideration, and it is anticipated that the experiments being carried out in order to ascertain the best means of extraction will be successful, and that such plant can be erected at a moderate cost. The royalty received from the tributaries' operations on the Yankee Doodle mine amounted to £1,178. Owing to the falling off in grade the tributaries were compelled to cease operations as from the end of September last. The net result of the year's operations, after allowing for interest received, head office expenses, etc., shows a profit of £4,459, and £869 was brought in, making £5,328, which it is proposed to carry forward.

Improved Sanitation Underground on the Rand.

THE O'BRIEN IMPROVED PATENT DRY EARTH CLOSET SYSTEM.



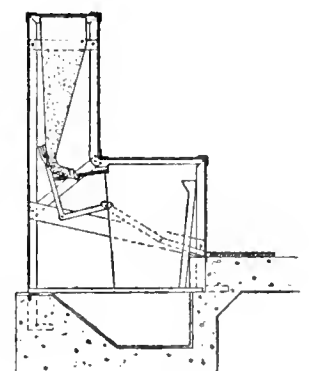
SECTION showing Hopper and Gearing in position of rest, or immediately after foot lever has been released.

The O'BRIEN Premier Dry Earth Closet System has undoubtedly proved itself to be the PREMIER of all dry earth systems, and only requires to be known on the mines to secure its general adoption.

THE PRINCIPLE OF THE SYSTEM IS THE SEPARATING OF THE LIQUID FROM THE SOLID OR FAECAL MATTER, which is done by mechanism inside the pan. The Liquid is run into a chamber under or near the pan, which chamber is partly filled with a chemical absorbent preparation, and combining with the preparation thereby forms A PERFECTLY PURE, ODOURLESS SOLID, or by other means treated and allowed to flow away pure. The faecal matter in the pan is automatically covered with a chemically prepared ash, rendering it absolutely odourless, and can be hoisted to the surface and carted away in open carts during the daytime.

The system itself is far superior to any other dry earth system, and has been largely ADOPTED BY THE SOUTH AFRICAN RAILWAYS and by the NEW SOUTH WALES GOVERNMENT FOR ALL BUILDINGS where no sewerage scheme is in use, also by MANY LEADING PUBLIC GENTLEMEN OF SOUTH AFRICA. In simplicity, cleanliness, and convenience it is far ahead of present practice.

Messrs. J. T. DITCHFIELD, LTD., will be happy to enter into Special arrangements with Mines, Municipal and other Public Bodies, and, on application, will furnish estimates, and, if required, designs for the installation and maintenance of the system.



SECTION showing Hopper and Gearing in position while in use.

Original Testimonials received by us can be seen on application by anyone interested, at the offices,

Box 5408, Telephone No. 5649, JOHANNESBURG.

ID. ESTABLISHED 1884. ID.
THE LEADING FINANCIAL DAILY OF THE WORLD.

The Financial News

THE FINANCIAL NEWS has the largest circulation of any financial newspaper in the World.

ALL THE NEWS OF ALL THE MARKETS.

Items of Important Exclusive Information
are given Every Day.

THE LATEST MARKET MOVEMENTS.

All the prices recorded on the
London Stock Exchange.

Up-to-date in all Financial Matters.
Most News. Exclusive Articles.

ANSWERS TO CORRESPONDENTS

Appear Daily, with the names of the Shares about
which the inquiry is made.

ON SALE EVERYWHERE.

Publishing, Advertisement and Editorial Offices:
111, QUEEN VICTORIA STREET, LONDON, E.C.

Branch Offices: (New York, 20, Broad Street.
Paris, 36, bis Boulevard Haussmann.)

TELEGRAMS—Finews, Cent. London TELEPHONES—CS30 City
(counts 2 words). (4 lines).

PUBLISHED DAILY IN FRENCH IN PARIS.

Britannia Engineering Co.

LIMITED.

General and Mechanical Engineers.

IRON AND BRASS FOUNDERS.

BOILER AND GENERAL SMITHS.

Repairs and Renewals promptly and efficiently executed.
Sole Makers of the Hearn Patent Pendulum Pump.

201-3-5, Main Street and 220-2-4, Fox Street,
Box 1558. **JOHANNESBURG.** 'Phone 896.

When communicating with Advertisers

kindly mention the

South African Mining Journal



DICK'S BELTING.

No Belt is a

DICK'S ORIGINAL BALATA

*unless stamped every few feet
with the Trade Mark.*

**FACTORIES: GLASGOW, SCOTLAND.
PASSAIC, NEW JERSEY, U.S.A.**

SOLE AGENT—

S. P. Ruthven,

3, WINCHESTER HOUSE,
JOHANNESBURG.

BOX 3013.

'PHONE 80.

TELEGRAMS: "BELTING."

EXPLOSIVES

For Mining, Quarrying, Farming, Railway and Irrigation Work.
"Permitted" Explosives for Coal Mines.

AGENTS:

LONDON.—CAPE EXPLOSIVES WORKS, LTD., 15, St. Swithin's Lane, E.C.

TRANSVAAL.—REUNERT & LENZ, LTD
Box 92, Johannesburg.

RHODESIA.—L. R. FORBES, Box 683,
Bulawayo, and Box 427, Salisbury.

KIMBERLEY.—CAPE EXPLOSIVES WORKS LTD., & E. W. TARRY & CO., LTD.

AUSTRALASIA.—KIRK O'BRIEN, Collins House, Collins Street, MELBOURNE.

MANUFACTURERS of

Blasting Gelatin, Gelignites.
Ligdyn Dynamites.
"Cape Brand" Subsoil Dynamite
Fuse Igniters.

Bi-Sulphate of Soda.
Sulphuric and Nitric Acids.
Sulphur & Sulphur Lime Solution
Pure Glycerine.

Fuse, Detonators and Electric Blasting Accessories Stocked.
Nitrate of Soda.

CAPE EXPLOSIVES WORKS

LIMITED,

P.O. DYNAMITE FACTORY,

SOMERSET WEST, CAPE PROVINCE.



FOURTEEN BUTTERS' FILTER PLANTS

AND FOUR EXTENSIONS TO FORMER PLANTS

now operating on the Rand and giving complete satisfaction to everyone concerned.

Full particulars and operating data will be given on application.

50 lb. samples of slime will be tested free of charge to determine its filtering capacity. Estimates for plants, accompanied by complete general arrangement drawing, supplied on short notice. Write us for pamphlet regarding our process.

CHAS. BUTTERS & CO., LTD.

(INCORPORATED IN ENGLAND)

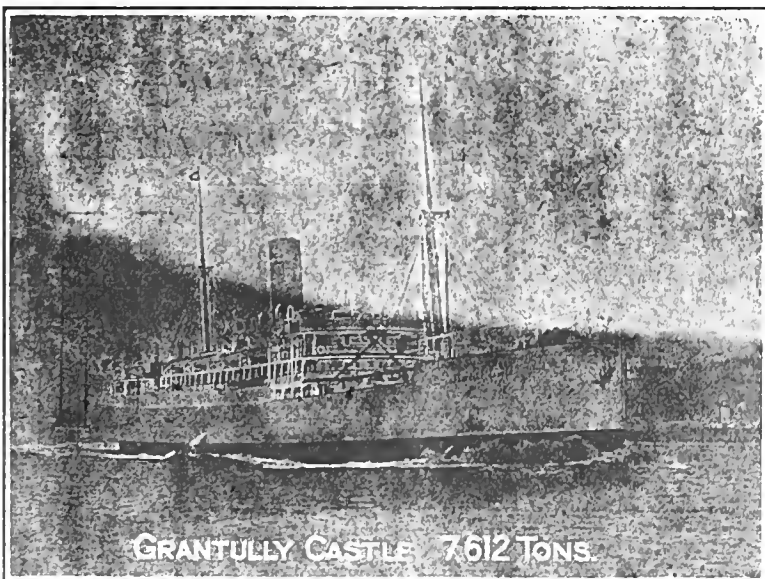
187, Exploration Building, Johannesburg.

P.O. Box 2652.

Telephone 3701.

Cable Address: "HUBNERITE."

FRASER & CHALMERS, LTD., AGENTS FOR SOUTH AFRICA.



Union Castle Line.

Sailings between SOUTH AFRICA and the UNITED KINGDOM by the Western Route, and by the Eastern Route (via Suez).

ROYAL MAIL STEAMERS sail homewards from Durban at daybreak every Sunday, and from Capetown at 1 p.m. every Saturday, calling at Madeira.

MAURITIUS AND REUNION SERVICE.—Sailings at stated intervals.

THROUGH BOOKINGS are arranged to America and Continental ports.

OUTWARD PASSAGES of friends in the United

Kingdom and the Continents of Europe and America, may be prepaid in South Africa.

COMBINED LAND AND SEA TOURS.—In conjunction with the Railway Administrations in South Africa, the Company issues Combined Rail and Steamer Tickets for Circular Tours at REDUCED FARES. Tickets are available for six months, and the journey may be broken at any point.

For full particulars of Freight and Passage Money apply to the Agencies of the

UNION-CASTLE MAIL STEAMSHIP COMPANY, LTD.,

AT CAPETOWN, PORT ELIZABETH, EAST LONDON, DURBAN, LOURENCO MARQUES, BEIRA AND JOHANNESBURG, OR TO THE SUB-AGENTS IN THE PRINCIPAL TOWNS.

Fraser &
Chalmers, Ltd.
Corner House,
JOHANNESBURG.

THE
**South African
MINING JOURNAL**
WITH WHICH IS INCORPORATED
"The South African Mines, Commerce & Industries."
ESTABLISHED 1891 PUBLISHED EVERY SATURDAY

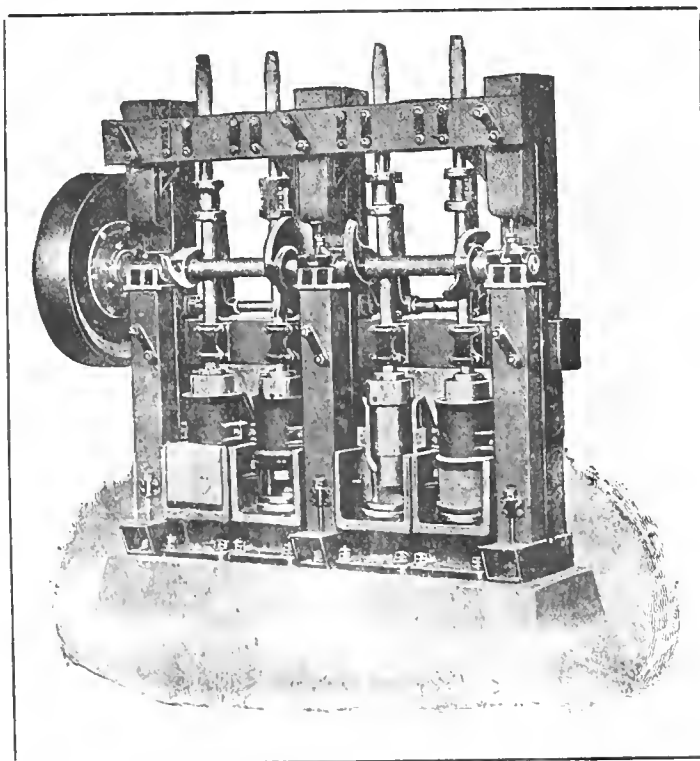
Fraser &
Chalmers, Ltd.
P.O. Box 619.
Telephone:
Private Exchange.
Telegrams: "VANNER."
JOHANNESBURG.

VOL. XXVI., PART I. No. 1318. THE SOUTH AFRICAN MINING JOURNAL. DEC. 30, 1916. [WEEKLY, PRICE 6D]

"NISSEN" STAMP MILLS.

Economical
in First Cost,
Power,
and
Maintenance.

16 NISSEN STAMPS
installed at the
MODDER B. G.M. Co.



Now being
adopted
in
all the latest
Mills.

56 NISSEN STAMPS
to be installed at
NEW MODDER G.M. Co.

Full Particulars from

FRASER & CHALMERS, Ltd.

(Incorporated in England),

Fifth Floor, THE CORNER HOUSE, Johannesburg.

P.O. Box 619. ————— Phones : 2605-10.

And at BULAWAYO and SALISBURY.